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# ILLINOIS MINERAL INDUSTRY IN 1988

and Review of Preliminary Mineral Production Data for 1989

Irma E. Samson and Subhash B. Bhagwat

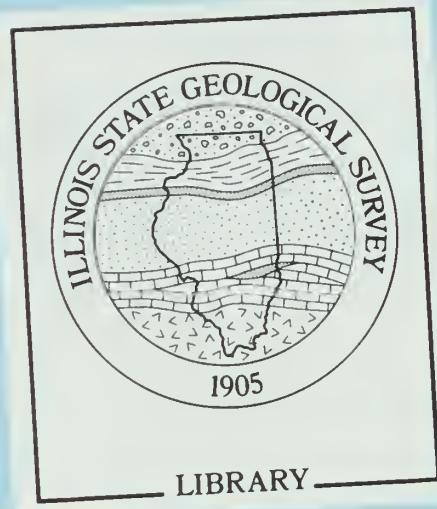


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**Cover photo:** Lone Star Industries' silica mining operation west of Elco in Alexander County. The silica is used by Lone Star in the manufacture of portland cement.



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and Review of Preliminary Mineral Production Data for 1989

Irma E. Samson and Subhash B. Bhagwat

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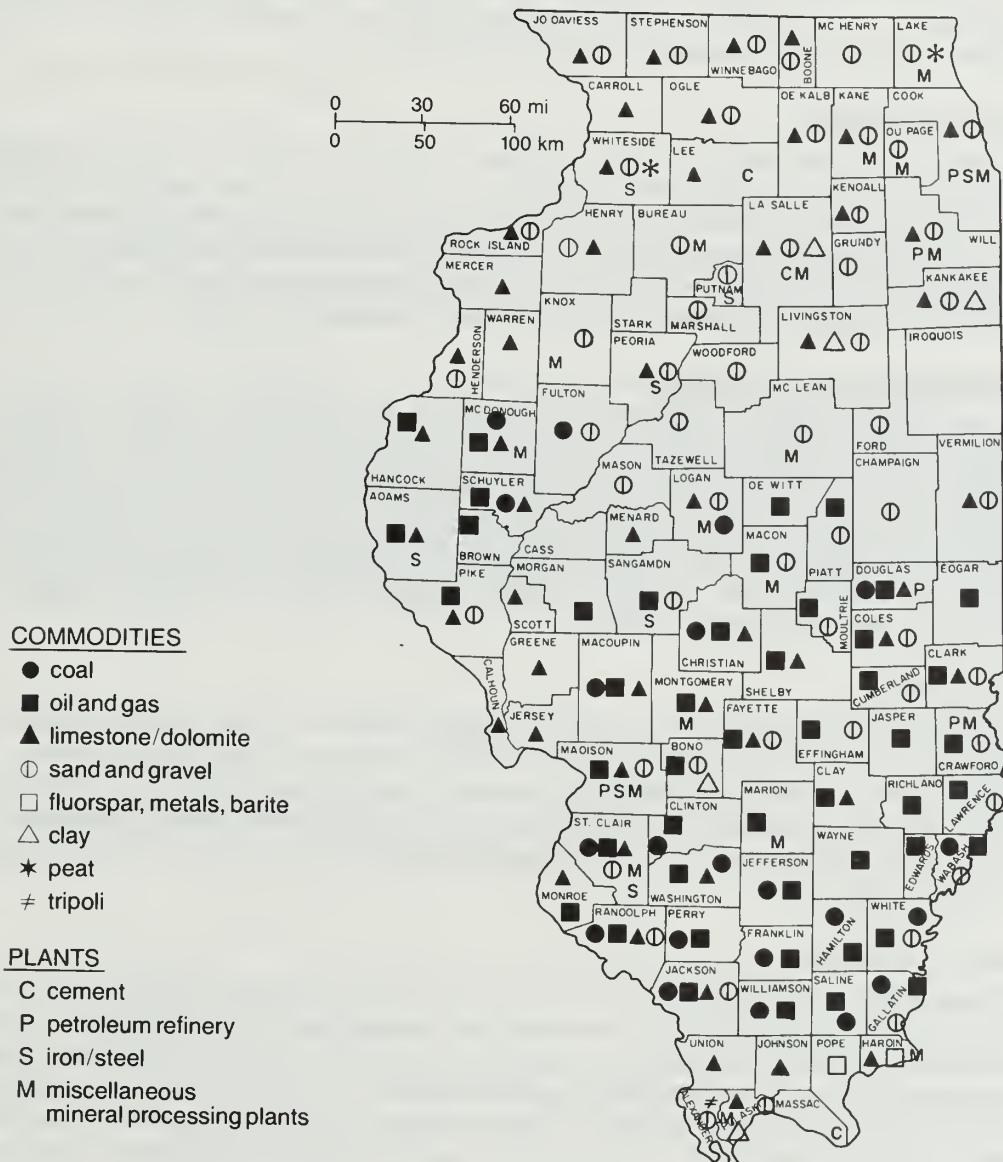
## EXECUTIVE SUMMARY

This report covers three types of operation in the mineral industry of Illinois (fig. 1):

- extracting minerals from the ground
- processing crude minerals (mined primarily out of state) into raw industrial materials
- manufacturing mineral products such as coke, lime, and cement from minerals extracted and processed primarily, but not exclusively, in Illinois.

### 1988 Reported Value

The reported value of minerals extracted, processed, and manufactured in Illinois during 1988 fell to \$2,807.6 million, a decline of 13.0 percent from the 1987 total. Reported value is not necessarily the actual value; for example, in 1988 the two largest producers of pig iron did not report their production figures, which were estimated to have totaled \$375 million. That would make the actual value nearly the same as in 1987.



**Figure 1** Mineral production in Illinois and mineral-processing plants.

Of the reported value, minerals extracted accounted for 88.8 percent; materials processed accounted for 2.5 percent and minerals manufactured, 8.7 percent. The leading commodities continued to be coal and oil, followed by industrial and construction materials (table 1; tables begin on page 22).

Illinois produced 6.3 percent of the tonnage and about 8 percent of the value of the coal produced nationally. The state continued to lead the nation in the production of fluorspar, industrial sand, and tripoli. Production of stone and sand and gravel was commensurate with Illinois' proportion of the U.S. population (table 2).

### **Extracted Minerals**

The value of commodities mined in Illinois in 1988 was \$2,492.2 million, a decrease of 4.9 percent from 1987. Mineral fuels such as coal, crude oil, and natural gas accounted for 82 percent of the total. Industrial and construction materials such as clay, fluorspar, sand and gravel, stone, and tripoli accounted for 17.8 percent. The remaining 0.2 percent came from metals, such as lead, zinc, and silver, and from other minerals, such as peat and gemstones.

In 1988, mineral extraction was reported by 99 of the 102 counties in Illinois (table 3). Perry and Franklin Counties, major producers of coal and crude oil, accounted for 11.3 and 9.5 percent of the state's total value of minerals produced.

### **Processed Minerals**

Figures for the total reported value of processed minerals in 1988 are incomplete because production totals for pig iron were not received. In 1987, pig iron represented 82 percent of the total value of minerals processed. Other processed minerals include natural gas liquids, expanded perlite, sulfur, ground barite, calcined gypsum, exfoliated vermiculite, iron-oxide pigments, crude iodine, bismuth, columbium, tantalum, and primary and secondary slab zinc. Their value in 1988 was about \$48 million, a slight increase over 1987.

### **Manufactured Mineral Products**

Mineral products manufactured in Illinois, primarily from minerals mined within the state, included cement (portland and masonry), coke, clay products, lime, and glass. They were valued at \$245.2 million, which represents a 29-percent increase from the 1987 total. The value of sales of portland cement increased about 9 percent; masonry cement declined 23 percent. For lime, production was up 20 percent and value 17 percent. Clay products increased more than 50 percent from 1988. Information about the value of glass or coke is no longer reported by the U.S. Bureau of Mines (USBM).

### **Employment**

The Illinois Department of Labor reported a slight increase in employment in the state's mineral industries, from 116,000 workers in 1987 to 117,000 workers in 1988. Jobs in mining, quarrying, and oil and gas extraction decreased 10 percent from 23,400 in 1987 to 21,100 in 1988. This was compensated for by an increase in employment in mineral processing, from 60,100 to 61,300 persons, and in the mineral manufacturing sector, from 32,500 to 34,600 persons (table 4).

### **Mineral Shipments**

Mineral shipments are a large part of the Illinois transportation industry. Most stone and sand and gravel are shipped by truck since these products are used primarily near the quarries. Coal is shipped primarily by rail, barge, or rail/barge combination; only about 5 percent of the coal was moved to mine-mouth electricity-generating plants by conveyor belt. Crude oil and natural gas are mainly transported by pipeline. Other materials, such as fluorspar and clay products, were shipped by rail, truck, and barge. Pig iron and coke are generally used on site by integrated mills.

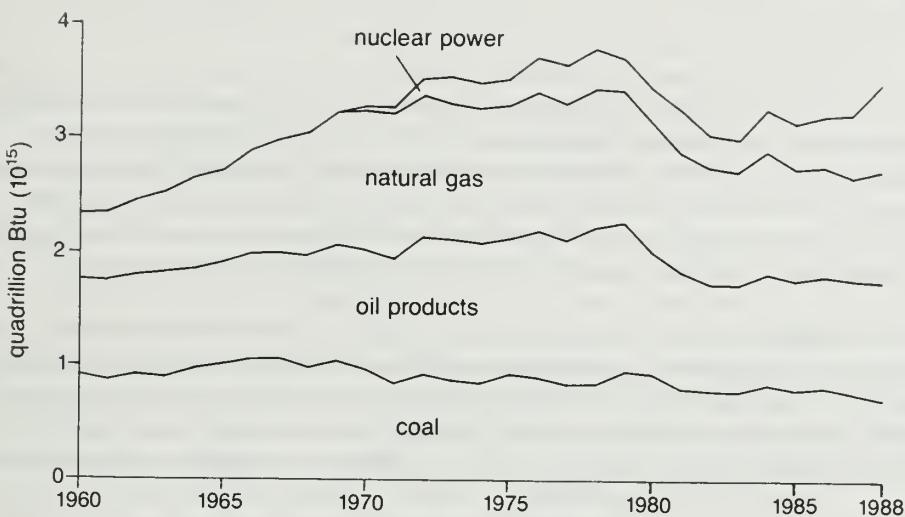


Figure 2 Energy used in Illinois, 1957-1988.

### Consumption

The value of the state's consumption of mineral commodities in 1988 was about 5 percent of the nation's total, or about the same proportion as Illinois' share of the U.S. population. In physical units, Illinois' mineral consumption varied from less than 1 percent of the U.S. total (for kerosene) to almost 17 percent (for zinc) (table 5). The high zinc consumption reflects Illinois' status as a major manufacturing state.

The state's energy consumption in 1988 was estimated at 3.5 quadrillion Btu (4.5 percent of the U.S. total), or about 9 percent above 1987 (table 6). Fossil fuels supplied about 79 percent of the state's energy needs: 30 percent from oil and oil products, 29 percent from natural gas, and 20 percent from coal (fig. 2). Illinois consumed 743 trillion Btu of nuclear power in 1988, compared with 541 trillion Btu in 1987. For the first time, nuclear energy consumption in Illinois surpassed coal consumption. The increase was attributable to an increased load factor in several nuclear power plants that came on stream during 1986-1987 and to the startup of Commonwealth Edison's Braidwood 2 station in 1988.

## MINERALS EXTRACTED

### Fuels

#### Coal

**Production** Illinois' production of 59.9 million tons of coal, or 6.2 percent of the U.S. total in 1988, ranked fifth among the coal-producing states behind Kentucky, Wyoming, West Virginia, and Pennsylvania. The 1988 production was valued at \$1,709 million, with a unit value of \$28.55 per ton, a 3.4-percent decrease in value from 1987. Production (fig. 3) decreased 1.5 percent from the 1987 level (table 7). Perry, Franklin, Randolph, Saline, and Jefferson Counties continued to be the leaders, together accounting for about 59 percent of the state's total production.

Perry County was again the state's top producer, contributing 18 percent of all coal produced in the state in 1988. All of its coal came from surface mines; the county produced more than 55 percent of the state's total for surface-mined coal. Jackson County contributed about 14 percent of the surface-mined coal. All of Franklin County's production came from underground mines. Its share was 15 percent of all coal mined in the state; 22 percent came

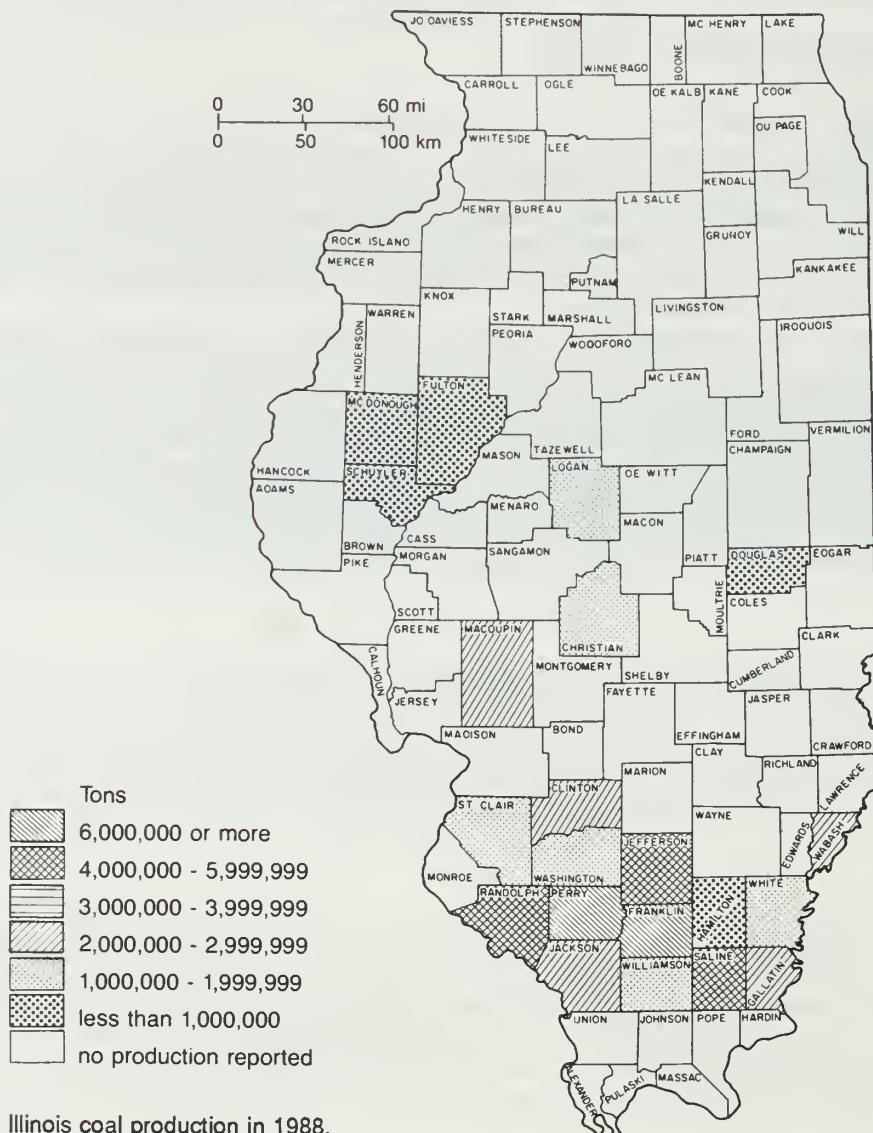


Figure 3 Illinois coal production in 1988.

from underground operations. Other counties contributing substantially to underground coal production were Randolph and Saline, each with 11 percent, and Jefferson with 10 percent.

Since the early 1900s the number of coal mines operating in Illinois has been steadily declining. In 1900 there were 920 mines. By the 1950s approximately 200 mines were in operation. A further rapid decline to about 60 mines had occurred by 1970. In the latter half of the 1970s, the number of mines increased to about 70 as new mines opened after the first oil-price shock of 1974. Demand for Illinois coal did not increase, however, and the number of mines dropped again in the 1980s. By 1988, only 43 mines remained in operation: 27 underground mines, accounting for 67 percent (39.9 million tons) of the state's total production, and 16 surface mines, accounting for 33 percent (20.0 million tons) (figs. 4 and 5).

The proportions of underground- and surface-mined coal have reversed in Illinois in 20 years as a result of changing economic and geologic conditions. This trend toward increased underground mining is expected to continue as surface-minable resources are consumed. Although part of the reason for reduced production from surface mines is the limited availability of surface-minable coal reserves, the cost of reclamation also contributes to the trend. Conversely, increased production from underground mines coupled with high-extraction mining techniques leads to ground subsidence and its attendant mitigation costs.

Illinois mines have produced about 5.32 billion tons of coal since 1833 (table 8). Surface mines operating since 1911 have supplied 1.25 billion tons, or 23.6 percent of the total. The average output per underground mine reached a peak of 1.52 million tons in 1975; since that time, average output has fluctuated between 0.9 and 1.4 million tons per year. In 1988, the average output was 1.48 million tons, 2.7 percent below the record high. The average surface-

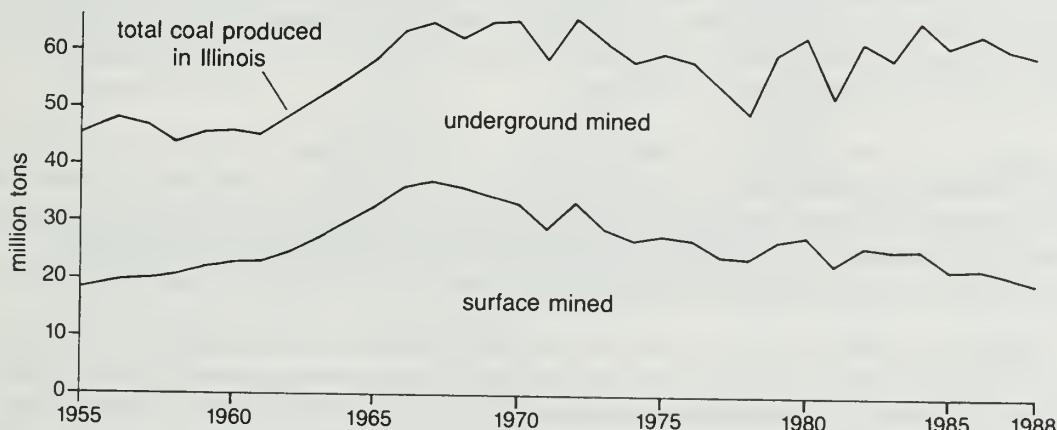


Figure 4 Trends in coal production.

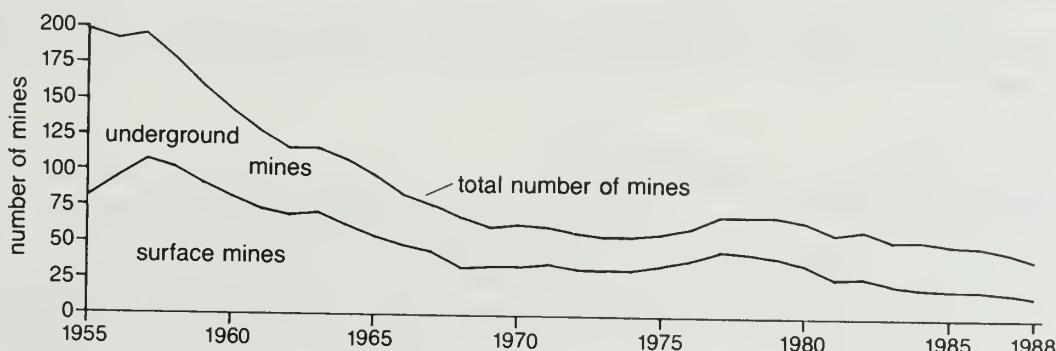


Figure 5 Trends in the number of mines.

mine output, which had been rising between 1977 and 1984, declined about 10 percent in 1985 but has been increasing since then, reaching 1.25 million tons in 1988 (table 9).

The trend in Illinois is toward fewer but larger coal mines. The industry is also highly concentrated. Although 20 coal mining companies operated in Illinois (table 10) in 1988, five companies—Consolidation, Old Ben, Peabody, Arch of Illinois, and Monterey—produced about 64 percent of the state's total. The share of the top five companies did not change significantly during the 1980s. By comparison, the U.S. coal-mining industry is much less concentrated. In 1988 the top five U.S. companies produced about 24 percent of the national total.

**Employment and wages** In 1988 employment in Illinois coal mines decreased 5.5 percent to 11,514 workers from 12,188 in 1987 (table 9). Employment in the mines has been declining since the 1979 high of 18,499. Underground-mine employment decreased by 4.7 percent, surface-mine employment by 8.2 percent. Average hourly wages rose to \$18.21 in 1988, up from \$17.21 in 1987 (table 4). The average number of hours worked weekly increased to 39.7, from 38.1 in 1987.

**Mine productivity** Productivity is calculated by multiplying average production per miner per hour by the average length of a miner's shift. Unrounded data are used in calculating percent changes. The labor productivity of underground mining operations in 1988 increased 10.2 percent to 20.3 tons from the previous year's 18.5 tons. The peak level was 22.9 tons in 1969. In surface mines, labor productivity decreased 1.6 percent to 26.7 tons from 27.2 tons in 1987. The peak year was 1967 with 41.6 tons (fig. 6). While the U.S. productivity levels in underground and surface mines have surpassed their past peaks reached in 1969 and 1974, the productivity levels in Illinois mines have yet to reach the past peak levels. This difference in national versus state mine-labor productivity indicates that the economic competitiveness of Illinois coal has declined during the 1980s.

**Prices** The average price of Illinois coal (f.o.b. mine) dropped 3.4 percent in 1988 from \$29.56 to \$28.55 per ton (table 7). The average price of coal mined underground in Illinois was \$29.62 per ton, and the price of surface-mined coal was \$26.50 per ton. Since 1979, the price of coal has increased 25.5 percent. This increase compensated for the excessive growth of wages compared to productivity. (However, labor accounts for only part of all mining costs.)

**Shipments** Illinois coal is used in 20 states to generate electricity, manufacture coke, and supply energy for other industries. About 89 percent of Illinois coal was sold to electric utility plants, 3 percent to plants manufacturing metallurgical coke, and 8 percent to industrial plants and retail dealers (table 11). Shipments to electric utilities decreased about 2 percent from 53.4

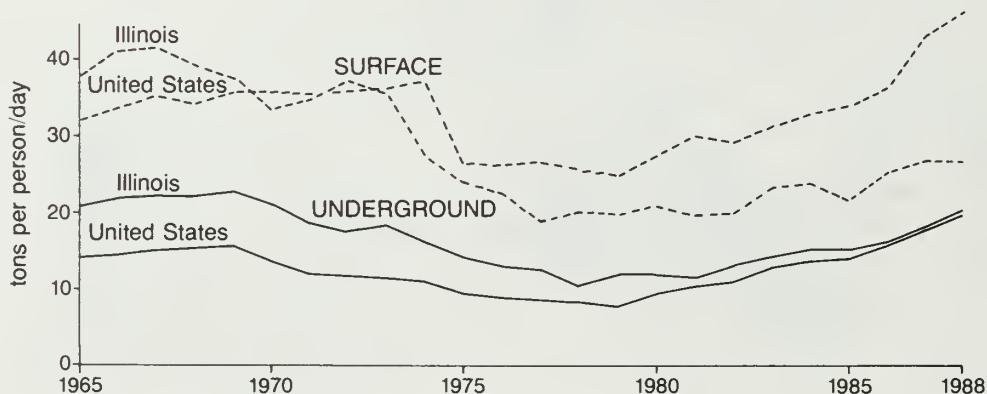


Figure 6 Trends in the productivity of coal mining, 1965-1988.

million tons in 1987 to 52.3 million tons in 1988; about 27 percent was shipped within state. Out-of-state shipments to utilities increased 1.4 percent; 34 percent of the out-of-state shipments went to Missouri, 26 percent to Georgia and Florida, and 21 percent to Indiana.

About 94 percent of Illinois coal used in coke making was shipped to coking plants in northwestern Indiana. Less than 500 tons went to Ohio, and the remainder was consumed within the state. Of the Illinois coal used for other industrial activities, about 54 percent was consumed within the state and about 19 percent was shipped to Missouri, 10 percent to Iowa, and 7 percent each to Indiana and Wisconsin.

**Transportation** Coal was shipped from mines to the consumer by rail, barge, and truck. Barge or rail/barge combination is gaining importance in Illinois as transportation costs become an important item of price competition. Illinois coal depends primarily on out-of-state markets, and transportation costs must be kept low to compete with other coals.

	Tonnage <sup>1</sup>		
	1986	1987	1988
Rail	48,125,328	42,853,324	34,823,910
Barge or rail/barge <sup>2</sup>	5,772,410	9,993,890	16,034,932
Local trade and truck <sup>3</sup>	13,331,084	8,169,401	7,043,046
 Rail lines			
Illinois Central Gulf	18,792,734	19,230,738	19,049,900
Missouri-Pacific Lines	17,500,294	15,857,295	15,026,301
Norfolk-Southern	6,759,101	6,495,336	5,968,193
Chicago-Northwestern	1,981,556	1,674,509	1,748,509
Burlington Northern	2,087,902	1,725,161	2,574,678
Others	<u>5,109,837</u>	<u>4,822,873</u>	<u>4,415,228</u>
	52,231,424	49,805,912	48,782,809

<sup>1</sup> Tonnages do not total because part of the rail tonnage is shown in the combined rail/barge category, and some was shipped from inventory.

<sup>2</sup> Part of this coal was sent from mine to barge loading facility by conveyor belt.

<sup>3</sup> Part of this coal was sent by truck to barge.

Source: Illinois Department of Mines and Minerals.

**Consumption** Illinois coal consumption in 1988 decreased by about 7 percent (32.9 million tons) for the second consecutive year (table 12). After reaching a high in 1984, annual coal shipments from Illinois mines to Illinois markets have declined 17 percent. The decline was the result of increased use of nuclear energy. From 1984 to 1988, total coal consumed in Illinois electric utilities declined about 18 percent, 9 percent in the past year alone. Coking-coal consumption in Illinois also declined in the past year (14 percent). However, industrial consumption rose about 8 percent. In 1968 more than 82 percent of the total coal consumed in Illinois was also produced within the state; in 1988, in-state mines supplied only 52 percent.

#### Crude Oil

**Production** The 6.7-percent drop in Illinois production in 1988 marked the third straight annual decline. The 1988 production of 22.5 million barrels was valued at \$332.4 million, with an average value of \$14.79 per barrel, representing a 15.5-percent decrease in per-barrel value from the previous year (table 1). The secondary production method of waterflooding accounted for about 10.1 million barrels or about 45 percent of the state's total. Pressure-maintenance operations produced an estimated 675,000 barrels or 3 percent of the state's total. About 3.4 billion barrels of oil have been produced in Illinois during the past 100 years (table 13).

Illinois ranked 15th of 31 oil-producing states in 1988. Forty-seven counties produced crude oil (table 13). The following nine counties produced more than 1 million barrels each, contributing about 66 percent of the state's total oil production.

County	1987	1988	County	1987	1988
Lawrence	10.7%	13.0%	Fayette	5.7%	5.4%
Crawford	8.0	9.8	Wabash	4.7	5.1
White	9.2	9.3	Clay	5.3	4.9
Wayne	8.0	7.7	Jefferson	5.2	4.5
Marion	9.1	5.9			

An oil field producing more than 200,000 barrels per year is considered a major field in Illinois. There were 15 major fields in 1988, compared to 19 the previous year. The combined production of these fields in 1988 amounted to 60 percent of the state's total (table 14). The six largest fields—Lawrence, Main Consolidated, Clay City Consolidated, Salem Consolidated, Louden, and New Harmony Consolidated—each produced more than 1 million barrels during 1988 or about 47 percent of the state's total.

In 1988, 27 new wells were reported to have initial production of 100 or more barrels of oil per day; two wells produced 200 barrels per day. The average daily per-well production in Illinois remains well below three barrels, and thus the state remains sensitive to oil price changes.

Crude oil production reached a peak of 147.6 million barrels in 1940 (fig. 7). From that level, oil production by primary recovery methods declined steadily until 1973, although some years showed small gains. Introduction of the hydraulic rock-fracturing method in 1954 and the

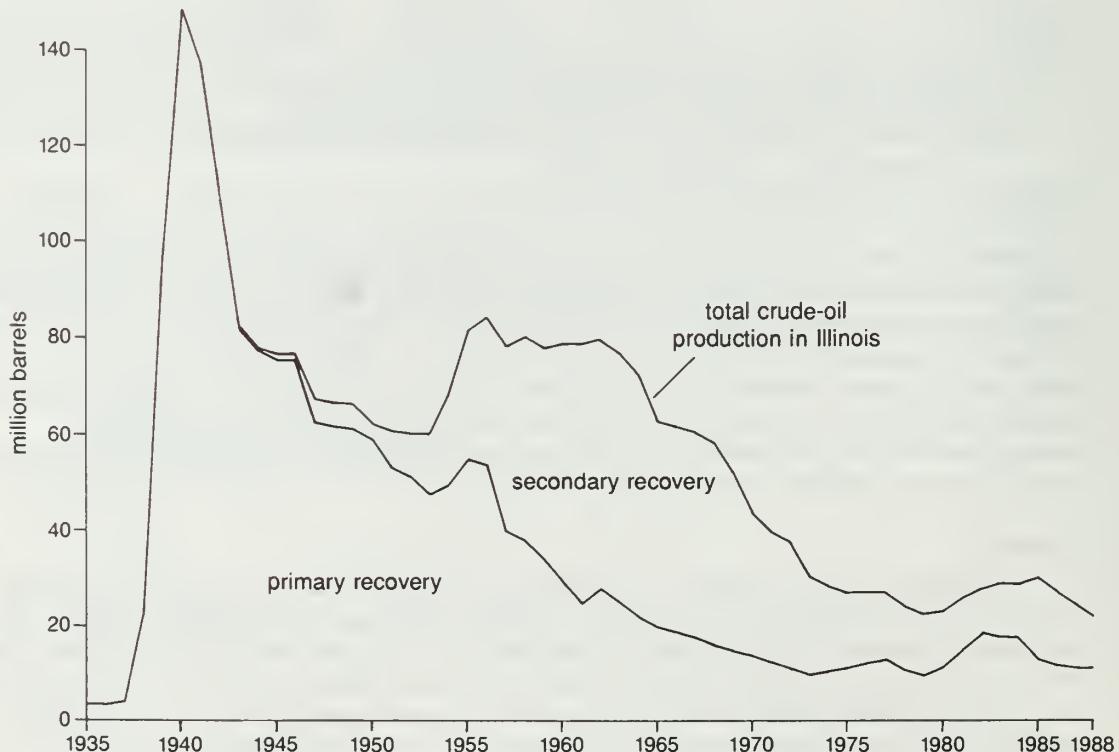


Figure 7 Annual crude oil production.

increased use of waterflooding stabilized oil production at about 78 million barrels per year from 1955 to 1962. Production fell steadily after 1962 as reserves were depleted. The lowest production since 1939 was reached in 1979—21.8 million barrels.

By December 1988, reserves were 143 million barrels, 6.5 percent below the total reserves of December 1987. Current reserves are 80 percent below the 700-million-barrel reserve of January 1956.

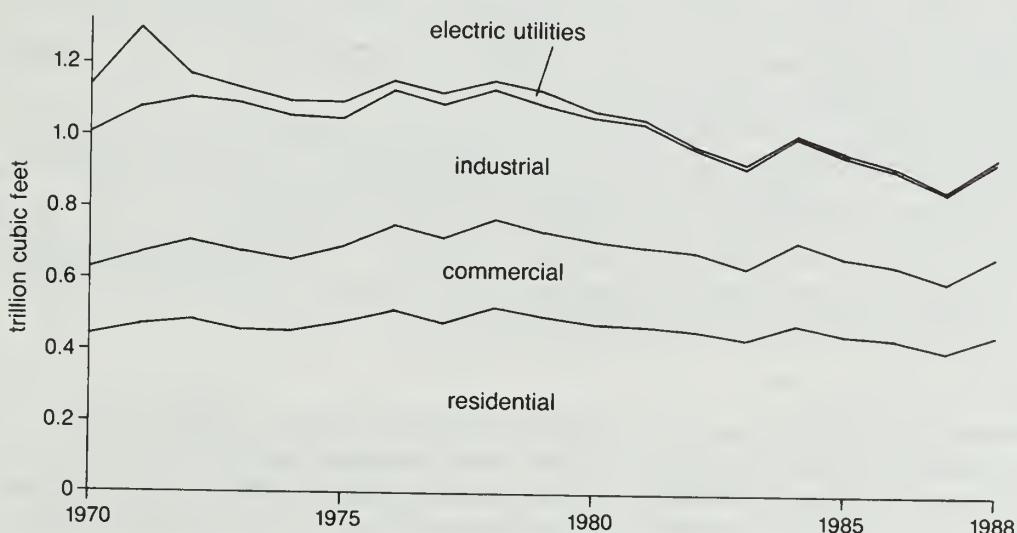
**Refineries** At the beginning of 1989, Illinois had six operating refineries, one fewer than the year before. Motor Oil Refining at McCook closed after six years of operation. Refineries are located in Cook, Crawford, Madison, and Will Counties. Total capacity was 889,200 barrels per day, or nearly 15 times the daily oil production in Illinois. Refining capacity is up 4 percent from January 1, 1988.

**Consumption** Consumption of major petroleum products in Illinois increased 5.4 percent in 1988. Gasoline consumption increased 7 percent. Kerosene consumption registered the largest percentage increase, about 18 percent; however, kerosene consumption is a small part of the total consumption for petroleum products. Use of liquefied petroleum gas increased 10 percent, while residual fuel oil, lubricants, and asphalt and road oil all decreased (table 15).

#### **Natural Gas**

**Production** Natural gas is not a major production commodity in Illinois. In 1988, production increased 7.3 percent. Gas wells yielded 6.1 percent more than the previous year, and gas from oil wells increased 16.3 percent (table 16). Morgan County was the top producer with 38 percent of the state's total, followed by Coles (17 percent), Wayne (13 percent), and Pike (10 percent) (table 17). The average wellhead value of Illinois gas decreased 2 percent from \$2.24 per thousand cubic feet (Mcf) in 1987 to \$2.19 in 1988 (table 1).

**Consumption** Natural gas consumption in Illinois increased 10.5 percent in 1988 (table 18). The average value of natural gas consumed in the state fell 4.6 percent from \$4.56 per Mcf in 1987 to \$4.35 in 1988. Natural gas delivered to consumers had been on a downward trend since 1971 (fig. 8); however, consumption increased in all categories in 1988. Electric utilities accounted for the largest percentage increase, though their total use still represented a small volume of gas.



**Figure 8** Consumption of natural gas, 1970-1988.

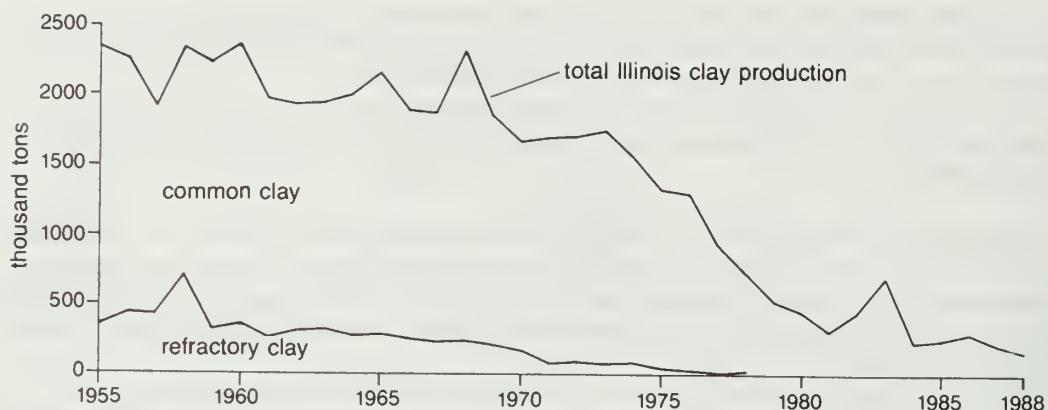


Figure 9 Trends in clay production, 1955-1988.

## Industrial and Construction Materials

### Clays

**Production** Both common clay and absorbent clay (fuller's earth) are mined in Illinois. Common clay is defined as a clay or claylike material that is sufficiently plastic to permit ready molding. Fuller's earth is a clay or claylike material that has absorbing, decolorizing, and purifying properties. Illinois clay production (excluding fuller's earth) continued its downward trend in 1988, decreasing 23 percent to 180,306 tons from 232,949 tons in 1987 (fig. 9). Refractory clay has not been produced in Illinois since 1982. Nationally, the clay industry has been growing steadily for several years. Total U.S. production of clays increased 3 percent in 1988. In Illinois, however, the downturn began 20 years ago and continued in 1988 as competition from cheaper southern clays remained keen.

The average value per ton of common clay in 1988 decreased 6.9 percent to \$3.90. The total value fell 28 percent to \$703,945. Six companies reported production of clay from four Illinois counties. Bond County was the leading producer, with Livingston County running a close second. La Salle and Kankakee Counties also produced common clay. Two companies produce absorbent clay (fuller's earth). Their combined production increased 10 percent and value 12.6 percent in 1988.

**Uses** Common clays and shales mined in Illinois are used to manufacture bricks, sewer pipes, drain tiles, wall tiles, dinnerware, lightweight aggregates, and cement. The primary product use in 1988 remained building bricks, which accounted for about 75 percent of Illinois clay production (135,480 tons valued at \$559,670).

About 15 percent of the state's 1988 production of common clay was used for portland cement, structural concrete, concrete blocks, and highway surfacing. That is down from 33 percent in 1987. The overall drop in construction and highway resurfacing was largely responsible for the decreased demand. Sales of Illinois clay to manufacturers of sewer pipe and drain tile accounted for the remaining 10 percent of production. This sector's demand dropped 25 percent from 1987 levels. Absorbent clay from Pulaski County was used mainly in the production of animal litter and oil and grease absorbents.

### Fluorspar

**Production and shipments** U.S. production of finished fluorspar appears to have stabilized at about 70,000 tons during the 1980s. Lower production levels of 61,000 tons in 1983, the lowest in 50 years, and 66,000 tons in 1985 were partially offset by the 1986 high of 78,000 tons. The United States depends on foreign sources for more than 90 percent of its fluorspar requirements.

Illinois continued to lead the nation in production of fluorspar, contributing more than 90 percent of U.S. shipments. Small shipments from Nevada, Texas, and Kentucky (reprocessed tailings) accounted for the remaining 10 percent. Fluorspar was mined in Illinois by one major and one small producer. Zinc concentrate was produced as a coproduct of fluorspar processing in Illinois. In addition to the fluorspar mined in Illinois, about 57,000 tons of fluosilicic acid was recovered from 13 phosphoric acid plants in the United States in 1988. That is the equivalent of 100,000 tons of fluorspar based on the fluorine contents of fluorspar and fluosilicic acid.

Ozark-Mahoning Company, the nation's leading fluorspar producer, operated two mines and a flotation plant near Rosiclare in Hardin County. Ozark-Mahoning also dried imported fluorspar to supplement its production. The Hastie Trucking and Mining Company, near Cave in Rock in Hardin County, mined a little ore and shipped it to the steel industry. Ozark-Mahoning Company negotiated to purchase certain assets of the Inverness Mining Company, including the Minerva No. 1 mine and mill near Cave in Rock and adjacent undeveloped acreage. Inverness is a subsidiary of Seaforth Mineral and Ore Company of Cleveland, Ohio. Ozark-Mahoning planned to dewater and rehabilitate the mine and begin with a small level of production by 1989.

**Consumption** Reported consumption of fluorspar (acid-spar and metallurgical-spar only) in the United States increased 17 percent from 598,368 tons in 1987 to 700,000 tons in 1988. The hydrofluoric acid industry accounted for 75 percent of the reported consumption. The remaining 25 percent was used mainly by the steel industry as a flux and in the ceramics industry for manufacturing glass, welding-rod coatings, enamels, and water fluoridation (fluosilicic acid).

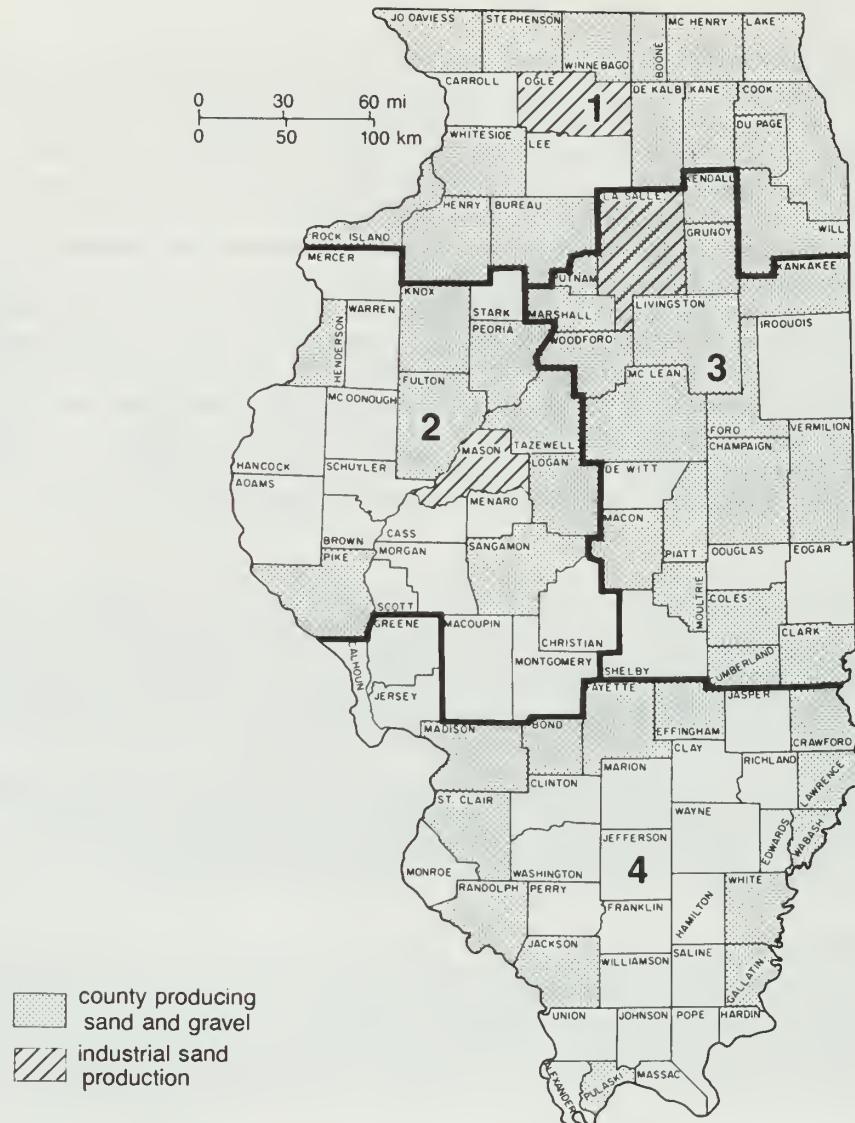
The apparent U.S. consumption (production + imports - exports  $\pm$  change in stocks) increased from 719,512 tons in 1987 to 750,000 tons in 1988, a 4.2-percent gain. The discrepancy between apparent and reported consumption is often large for many minerals, including fluorspar, because not all users report consumption to the USBM.

### ***Sand and Gravel***

Since 1981, the USBM has been surveying sand and gravel producers only in even-numbered years. In odd-numbered years, only estimates are published. In 1985, the USBM began compiling sand and gravel production by district rather than by county to preserve the confidentiality of individual producers (fig. 10). Individual county data are no longer available.

**Production and uses** Sand and gravel deposits are widely distributed in Illinois. Glacial deposits, chiefly valley trains and outwash plains, are the principal sources of construction sand and gravel. In 1988, production was 30.1 million tons, an increase of more than 6 percent from the 1987 estimate. The combined value of sand and gravel was \$93.5 million (table 19) with an average unit value at the pit of \$3.11 per ton, down 5.8 percent from 1987 (table 1). Illinois ranked ninth in the production of sand and gravel in 1988. Illinois' construction industry in 1988 showed a growth of about 5 percent compared with a nationwide decline of about the same amount. The ninth ranking in sand-and-gravel production does not accurately reflect the strength of Illinois' construction activity because sand and gravel is also brought into Illinois from neighboring states.

Three counties in District 1, McHenry, Kane, and Lake, and one county in District 3, Marshall, accounted for more than 58 percent of the state's production. McHenry County ranked first in production of sand and gravel in Illinois and Kane County second. Of the state's total production, District 1 accounted for 63.3 percent; District 2, 7.6 percent; District 3, 21.5 percent; and District 4, 7.5 percent. In 1988, 107 companies operated 157 pits at 155 operations in 55 counties of Illinois (fig. 10). About 35 percent of the state's production came from operations of 1 million tons per year and more, and about 15 percent came from operations between 200,000 and 300,000 tons per year (table 20).



**Figure 10** Districts and counties producing sand and gravel in 1988.

**Transportation** Because of its low unit price, most construction sand and gravel is not shipped farther than 50 miles from the pit. Operations on navigable rivers may ship material much farther by barge. About 66 percent of the sand and gravel was shipped by truck in 1988, with the remainder shipped by barge or used at the pit, for example, in asphalt production.

**Consumption and uses** Production reported is actually material sold or used; stockpiled production is not reported until it is sold or consumed. Illinois sand and gravel is used primarily as various types of construction aggregate (table 21). Total consumption of sand and gravel in 1988 was estimated to have increased about 8 percent over the 1986 level due to a growth in construction activity in Illinois of 5.7 percent.

#### *Industrial Sand*

**Production** Illinois continued to rank first of 38 states in industrial sand production in 1988, accounting for 4.3 million tons (15.2 percent of the U.S. total). The total value was \$56.1 million. Five companies operated eight pits in La Salle, Mason, and Ogle Counties. The average unit value increased to \$12.97 per ton from \$10.48 per ton in 1987.



Figure 11 Districts and counties producing stone in 1988 (patterned areas).

**Transportation** Industrial sand was shipped mainly by rail, but smaller amounts were shipped by truck and barge. A trend away from trucking has been evident in the past few years, indicating that industrial sand is being shipped longer distances.

**Consumption and uses** Industrial silica sand was produced in two forms, ground and unground. Unground sand was used primarily in glass manufacturing (42 percent of the total). Other uses included molding (28 percent of the total), sand blasting, grinding and polishing, railroad-traction sand, filtration sand, and propping sand for hydrofracturing reservoir rock in oil wells. Ground sand was used in chemicals, abrasives, enamels, pottery, porcelain, tile, and various fillers. Silica sand consumption in 1988 was nearly unchanged from 1987; however, value increased 23 percent.

### Stone

Since 1981, the USBM has been surveying stone production only in odd-numbered years. Actual data are given for 1987 with estimates for 1988. In 1985, the USBM began compiling stone production in Illinois by district (fig. 11). Individual county data are no longer available.

**Production** Total Illinois stone production was estimated at 57.9 million tons in 1988, an increase of 11 percent from 1987. Considerable highway construction in the Chicago metropolitan area (Cook, Du Page, Kane, Kendall, Lake, McHenry, and Will Counties) and a general growth of construction activity in the state led to the increased stone production. The total value was estimated at \$251.2 million, a gain of about 16 percent. Illinois ranked fifth of 49 producing states in the production of crushed stone.

Vulcan Material Company's McCook Quarry and Material Service Corporation's Thornton Quarry ranked as the seventh and ninth largest producers in the nation. Thornton Quarry can be observed from Interstate 80 south of Chicago. Material Services completed a tunnel under the Des Plaines River at the Romeo Quarry near Chicago to reach aggregate reserves on the river's west side, thus extending the quarry's operation by about 35 years. Central Limestone of Morris expects demand for rock produced by its new riprap plant to remain steady.

In 1987 (the latest year for which figures are available), 53 of the state's 102 counties reported stone production (fig. 11). There were 199 quarries operated by 106 companies.

**Shipments** Stone, a bulk commodity, is used primarily near the quarry; therefore, most of the stone is transported by truck. Some is used at the site. Small amounts go by rail or barge, as Illinois waterways are put to use by some producers along the river. Limestone is being transported by water from quarries operated by Dravo Basic Materials Company in Kentucky and Illinois, 800 miles to Pittsburgh, and more than 800 miles south to the Gulf Coast. The company's Gulf Coast markets are in Alabama, Texas, and Louisiana.

**Consumption** Stone is used principally for construction aggregate, especially as road-base stone, but also for chemical, agricultural, and other purposes. The small amount of dimension stone mined in Illinois is used as veneer in house construction, rubble, and flagging.

### *Tripoli*

**Production** The term "tripoli" refers to microcrystalline silica. Two of the nation's leading tripoli producers are in Alexander County in southern Illinois: Illinois Minerals Company, a division of Georgia Kaolin Company, and Tammsco, a Division of Unimin Corporation.

Illinois has been the nation's largest producer of siliceous materials, accounting for more than half the U.S. total. Actual production figures are confidential; however, crude tripoli production in Illinois increased 4 percent from 1987 to 1988, while value dropped 11 percent. Processed-material sales dropped 2.4 percent from 1987 levels, but value rose 1 percent.

**Consumption and uses** Tripoli processed in Illinois is used as filler in paints, plastics, and rubber products, and for abrasives in buffering and polishing compounds, soap, and toothpaste. Some iron-stained tripoli is now being used in the manufacture of portland cement.

### **Metals**

#### *Zinc, Lead, Silver, and Copper*

**Production** Zinc, lead, silver, and copper were recovered from fluorspar ore mined in Hardin County by Ozark-Mahoning Company. Metal production in general declined in 1988. Only copper production from sulfide concentrate remained unchanged; copper value increased 46 percent. Silver production and value per troy ounce showed the greatest declines, dropping about 52 percent and 58 percent, respectively. Zinc production fell 19 percent, but value increased 16 percent. Lead production fell 8 percent, and value dropped 5 percent.

### **Other Minerals**

#### *Peat*

The USBM formerly classified peat as a fuel. However, since all commercial sales of peat in the United States (excluding imports) are for agricultural and horticultural purposes, specifically for

soil improvement, peat has been placed in the nonfuel section. Three major kinds of peat—reed sedge, moss, and peat humus—were produced in Illinois by four companies in Lake and Whiteside Counties. Illinois ranked fourth after Florida, Michigan, and Minnesota of 22 peat-producing states. Peat production and value dropped 20 percent in 1988. About 99 percent of the state's total peat production was sold in packaged form, almost entirely for general soil improvement.

### ***Gemstones***

Limited to specimen-grade fluorite collected in the fluorspar mines in Illinois, gemstones contributed little to the total value of mineral production. The USBM in 1988 increased the estimated value of production to \$30,000. It had been \$15,000 for many years.

## **MINERALS PROCESSED**

This category refers to minerals extracted mainly in other states or foreign countries but processed in Illinois. These include ground barite, columbium and tantalum, calcined gypsum, crude iodine, iron-oxide pigments, natural gas liquids, expanded perlite, pig iron, sulfur, exfoliated vermiculite, primary slab zinc, and secondary slab zinc. The total given for the value of minerals processed is incomplete because the two largest producers of pig iron did not respond to the survey. Therefore, no figures are available for pig-iron production in Illinois.

### ***Ground Barite***

Two Illinois companies continued to process ground barite, Mineral Pigments and Metals Division of Pfizer in St. Clair County and Ozark-Mahoning Company in Hardin County. Illinois-processed ground barite is used almost exclusively as a filler or an extender in paints.

### ***Columbium and Tantalum***

Fansteel in Cook County reported processing columbium-tantalum concentrate imported from other countries. In 1988, Fansteel also produced tantalum metal. Columbium and tantalum are used primarily to produce various steel alloys.

### ***Calcined Gypsum***

Calcined gypsum, used primarily for prefabricated-housing materials such as wallboard, was processed by the National Gypsum Company in Lake County. The gypsum-wallboard market is very strong in the East North-Central division of the United States (Illinois, Wisconsin, Michigan, Indiana, and Ohio). In 1988 the production and value of calcined gypsum in Illinois stayed about the same as in 1987. Gypsum from flue-gas desulfurization has not entered Illinois markets because of the absence of plants generating usable gypsum.

### ***Crude Iodine***

Crude iodine was processed into inorganic compounds for commercial use at three Illinois plants: Abbott Laboratories in Lake County, Economics Laboratory in Will County, and West Argo-Chemicals in Lake County. Although crude iodine is used primarily as a catalyst or stabilizer, it also is added to animal feed, inks, colorants, pharmaceuticals, salt, and sanitary and industrial disinfectants.

### ***Iron-Oxide Pigments***

The production of finished iron-oxide pigments increased 5 percent in 1988; value rose 19 percent. The finished pigments were produced from iron ore imported from other states by three companies: the Prince Manufacturing Company in Adams County, Pfizer in St. Clair County, and Solomon Grinding Service in Sangamon County.

### ***Natural Gas Liquids***

Natural gas liquids include ethane, propane, isobutane, unsplit butane, and a combination of gasoline and liquefied petroleum gas. Natural gas liquids were processed in Douglas County by the U.S. Industrial Chemical Company, a division of Quantum Chemical Corporation. The U.S. Department of Energy reports that Illinois processed 757 million cubic feet of gas, all of it from Illinois production. No imports from out of state were reported. The total liquids extracted from gas in Illinois amounted to 44 thousand barrels.

### ***Expanded Perlite***

Crude perlite mined outside the state was processed by three companies: Silbrico Corporation in Cook County, Strong-Lite Products Corporation of Illinois in La Salle County, and Manville Products Corporation in Will County. The increase of 14 percent in production and 17 percent in value was attributed to a new perlite line started at Strong-Lite's Seneca plant. The company previously processed only vermiculite. The average price per ton for expanded perlite increased 2.5 percent in 1988.

Expanded perlite is used primarily as roof-insulation board and for horticultural purposes. Other uses include aggregate for concrete and plaster, insulation, and filters.

### ***Exfoliated Vermiculite***

Exfoliated vermiculite processed from crude vermiculite mined outside the state was produced by two companies in Du Page and La Salle Counties. The state's sales rose 8 percent and value 9 percent in 1988. The average value per ton dropped 5.6 percent. In Illinois, exfoliated vermiculite has the following uses:

	1987 (%)	1988 (%)
Loose-fill insulation	21.8	16.0
Block insulation	13.0	13.2
Concrete and plastic aggregate	13.8	13.3
Horticulture and agriculture	12.3	14.3
Fireproofing and other uses	39.1	43.2

### ***Pig Iron and Raw Steel***

Data on pig-iron output for Illinois are not available for 1988. In 1987 Illinois ranked seventh of ten states shipping pig iron. In the United States, pig iron was produced by 15 companies in 78 blast furnaces; five of the blast furnaces are in Illinois.

The American Iron and Steel Institute in Washington, D.C., ranked Illinois fifth in raw-steel production with 7.76 million tons, or 7.7 percent of the U.S. output in 1988. That is up about 9 percent from the 7.14 million tons in 1987. For several years Indiana, Ohio, Pennsylvania, Michigan, and Illinois accounted for about 70 percent of total raw-steel production. The financial outlook for the steel industry continued to improve as demand continued to increase and the reduced value of the dollar helped make domestic steel more competitive in world markets.

### ***Slag (Iron and Steel)***

Iron and steel slag production increased 4 percent in 1988; value increased 3 percent. Three companies operating five plants in Alton, Chicago, and Granite City processed slag from iron and steel furnaces. Three companies processed steel slag; one company produced both air-cooled and expanded slag, and one company produced only air-cooled slag. Slag was used mostly for construction aggregate.

### ***Recovered Elemental Sulfur***

Four companies in three counties, Crawford, Madison, and Will, recovered elemental sulfur as a byproduct of their oil refinery operations. Sales of sulfur increased about 1 percent from

255,929 tons in 1987 to 257,741 tons in 1988. Value per ton decreased 14 percent from \$26.0 million in 1987 to \$22.4 million in 1988.

#### ***Primary and Secondary Slab Zinc***

Amax Zinc Company in St. Clair County ended its involvement in the domestic zinc industry in September 1988 when it sold its Saugeet zinc refinery to Big River Minerals Corporation, a privately held company from St. Louis. The special high-grade refinery produced about 20 percent of the total primary zinc metal in the United States, or about 8 percent of total domestic consumption. The facility will be called Big River Zinc Corporation and employ about 365 people. Big River is one of four primary smelters producing in Illinois, Oklahoma, Pennsylvania, and Tennessee.

In 1988, Horsehead Resource Development Company, a subsidiary of Horsehead Industries, brought a new Waelz-kiln facility to Chicago to increase zinc recovery from the recycling of electric arc furnace dust, a byproduct of steel making.

Secondary slab zinc was processed at Illinois Smelting and Refining Company in Cook County. Production data for individual states are not available. Approximately 200 firms in Illinois, Indiana, Michigan, New York, Ohio, and Pennsylvania accounted for about 60 percent of the slab zinc consumed in the United States.

Eagle Zinc Company at Hillsboro is the only domestic producer of oxide by the American process. The company plans to increase capacity 50 percent to meet anticipated future demand. ASARCO, which uses the French process, plans to add a new furnace at its Hillsboro plant to increase its production, which comes entirely from zinc metal and scrap.

### **PRODUCTS MANUFACTURED FROM MINERALS**

Cement, clay products, coke, glass, and lime were manufactured in 1988 from crude-mineral materials mined in and out of state.

#### ***Cement***

**Production** Approximately 3.5 million tons of raw materials were used to manufacture cement in Illinois in 1988. The raw materials include cement rock (an argillaceous limestone containing calcium, silica, alumina, and magnesia), limestone, clay, shale, sand, fly ash, slag, gypsum, and tripoli. Four companies produced cement in Illinois: Illinois Cement Company, a subsidiary of Centex Corporation, and Lone Star Industries, both in La Salle County; Dixon-Marquette Cement, a subsidiary of Prairie Materials Sales in Lee County; and Missouri Portland Cement Company, a division of Cementia Oldings AG in Massac County. All four companies produced portland cement, and all except Illinois Cement Company produced masonry cement.

Portland cement sales increased about 9 percent in 1988. The value per ton increased more than 8 percent from \$40.69 in 1987 to \$44.10 in 1988 (table 22). Prepared masonry cement sales decreased 25.6 percent, but the price per ton increased 14 percent. Nearly all the cement was delivered in bulk by truck, though a small amount was shipped by rail and barge.

To improve productivity, Illinois Cement Company invested in two 55-ton haulage trucks and a hydraulic shovel for its quarry operation. Lone Star began a modernization project at its Oglesby plant. To boost plant capacity, a state-of-the-art raw grinding mill was installed along with new homogenizing silos and related equipment and a new high-efficiency air separator on its finishing mill. Lone Star also announced the development of a new cement called Pyrament. The cement hardens in 4 hours instead of the 7 to 14 days required for other cement. It is expected to revolutionize the way highways and airport runways are constructed.

Missouri Portland Cement completed modifications to the evaporative cooling system at its Joppa plant. The system features advanced nozzle technology, smaller, more effective sizing, and precise temperature and humidity controls. These allow the off-gas system to operate at a lower, more efficient temperature.

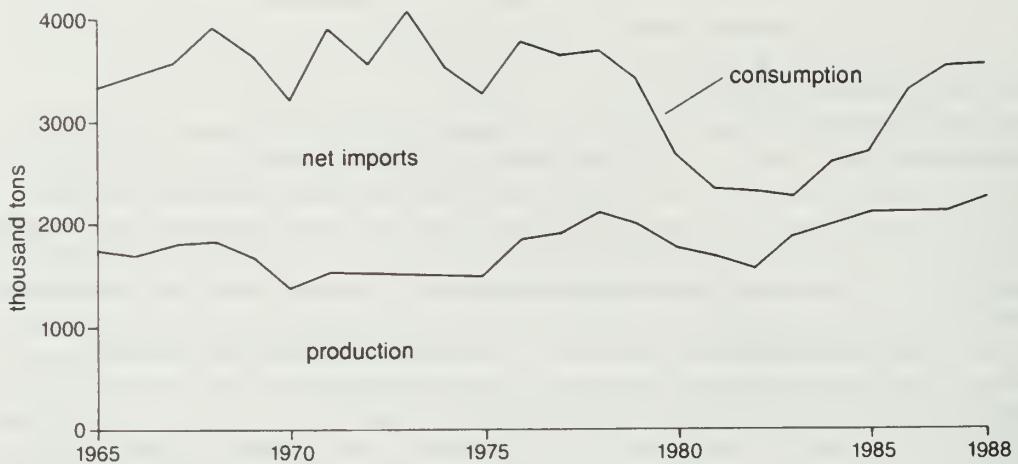


Figure 12 Production and consumption of finished portland cement, 1965-1988.

**Consumption** Illinois consumers used about 3.6 million tons of portland cement and 99,000 tons of masonry cement in 1988 (fig. 12). These figures represent slight increases, 1 percent in the use of portland cement and 3 percent for masonry cement. This indicates that construction activity continued to be high. Again, the gain was in the Chicago area (12.6 percent for portland cement and 4.5 percent for masonry cement). A decrease of about 14.7 percent was reported for the remaining counties of Illinois. The increase in the Chicago area is due to work on the city's expressway system. About 83.3 percent of the portland cement consumed was used by ready-mix concrete producers, 7.7 percent by manufacturers of concrete products and building-material dealers, and 9.0 percent by government agencies and others for highway construction and related purposes.

### Clay Products

To obtain accurate current information about the amount and value of clay products manufactured in Illinois, the Illinois State Geological Survey sends questionnaires every year to all producers in the state. Four companies reported mining clay in Illinois in 1988.

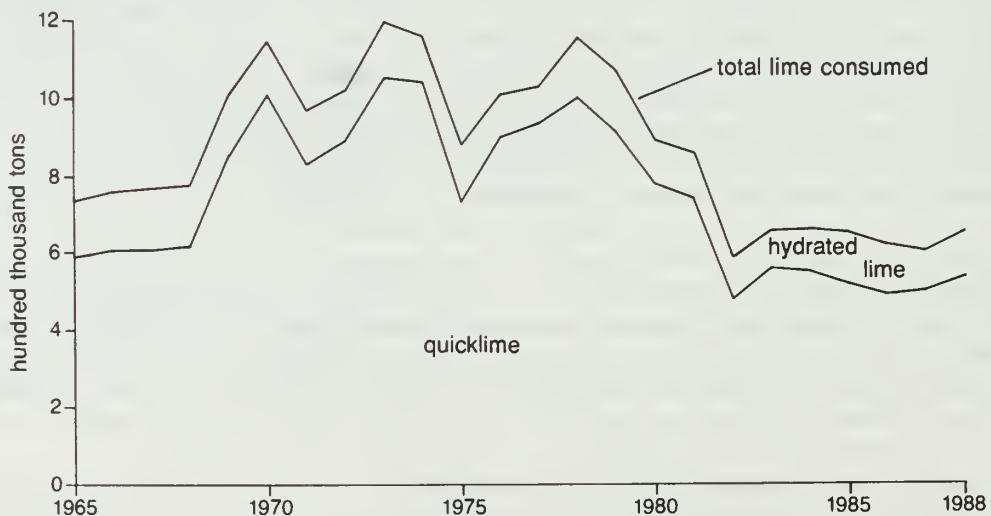


Figure 13 Trends in consumption of quicklime and hydrated lime, 1965-1988.

Clay products were valued at \$96.2 million. Whiteware and pottery increased from \$44.9 million in 1987 to \$60.1 million in 1988. All other clay products increased from \$18.2 million in 1987 to \$36.1 million in 1988.

#### **Coke**

**Production** All data on coke production in Illinois have been withheld. U.S. production increased 14.5 percent in 1988. The U.S. Department of Energy no longer provides state-by-state data on byproducts. The average U.S. price of coal receipts at coke plants in 1988 was \$47.70 per ton compared with \$46.55 per ton in 1987.

**Consumption and uses** Coke is used for pig-iron production, foundry and other industrial purposes, and residential heating. U.S. consumption increased from 29.4 million tons in 1987 to 33.2 million tons in 1988. Coke breeze was used as fuel in steam and agglomerating plants. State-by-state data on coke breeze are no longer available.

#### **Glass**

Glass and/or fiberglass was manufactured in Du Page, Lake, La Salle, Logan, McLean, Macon, Madison, Marion, Montgomery, St. Clair, and Will Counties. Production data are not available.

#### **Lime**

**Production** Illinois ranked seventh of 34 producing states in lime production in 1988. Data for lime cannot be disclosed. However, because of the increase in demand from the steel industry, production increased 20 percent and value 17 percent. Three plants in Cook County supplied the state's entire output. Two plants owned by Marblehead Company, a division of General Dynamics, produced quicklime and hydrated lime, and Vulcan Materials Company produced quicklime. Marblehead Company was the third-largest of 72 companies producing lime in the United States.

**Consumption and uses** Illinois users in 1988 consumed 538,000 tons of quicklime, a 6-percent increase from 1987, and 110,000 tons of hydrated lime, an increase of 11 percent (fig. 13). The turnaround of the Great Lakes steel industry, which operated at 85- to 95-percent capacity in 1988, accounted for the increased sales of lime. The main chemical and industrial use of lime is in the production of basic oxygen furnace steel.

## PRELIMINARY PRODUCTION DATA: 1989

### Minerals Extracted

The total value of minerals mined in 1989 was \$2.5 billion, or about 2 percent higher than in 1988, according to preliminary data (table 23). The higher value was a result of increased production of industrial and construction materials. The per-ton value of coal in 1989 is estimated to have declined slightly, and the price of oil was up about 24 percent from the 1988 average. Coal continued to be the leading mineral commodity in Illinois, contributing more than 66 percent to the total value. Oil ranked second, followed by stone, sand and gravel, and industrial sand.

### Fuels

Fossil fuels production in 1989 was valued at about \$2.1 billion, 2 percent higher than in 1988.

**Coal** The estimated per-ton value of coal for 1989 was \$28, down 55 cents from 1988. Coal production was estimated to have increased to 60.1 million tons in 1988. Table 24 shows that consumption in all categories except "other" increased in 1989. Coal shipments decreased to Wisconsin, Georgia, Iowa, and Florida, as well as to in-state users. Increases were recorded in shipments to Missouri, Indiana, Alabama, Tennessee, and Mississippi (table 25). Longwall mining at the Old Ben Coal Company No. 21 near Sesser was shut down in late 1989, and 75 persons were laid off. The company hopes to complete mining at No. 21 with continuous mining equipment. Freeman United Coal Corporation, a subsidiary of General Dynamics, began producing coal by longwall mining in its Orient No. 6 mine near Waltonville. Since beginning longwall mining, the company has reduced its work force by 108 employees to 320 miners.

**Crude oil and natural gas** Crude oil production in 1989 is estimated at 20.6 million barrels, an 8.5-percent decrease (table 23). Production is estimated to be worth \$376.0 million based on a preliminary value of \$18.28 per barrel. Oil price per barrel is estimated to have increased 24 percent.

Natural gas production is estimated to have increased by about 0.4 percent, although value fell 1.4 percent. The estimated unit value decreased 1.8 percent to \$2.15 per Mcf in 1989.

### Industrial and Construction Materials

The state ranked 17th nationally in the value of nonfuel-minerals production in 1989. Preliminary data show an increase of 6 percent in total value for industrial and construction materials (the data do not include an estimate for tripoli). Gains were expected in all commodities except clay. Common clay registered a decrease in production but an increase in value. Production of absorbent clay (fuller's earth) increased about 79 percent. In terms of value, crushed stone was the leading nonfuel commodity, followed by sand and gravel and industrial sand. Illinois ranked fifth nationally in production of both crushed stone and sand and gravel. In 1989, exploration increased for fluorspar, zinc, lead, and barite in southern Illinois. Pennwalt Corporation, the parent company of Ozark-Mahoning Company, the nation's largest producer of fluorspar, was acquired by the French oil giant Société Nationale Elf Aquitaine in March 1989. The company reorganized, and the subsidiaries, including Pennwalt, became Atochem North America. Unimin Corporation purchased Illinois Minerals Company in October 1989, creating only one company with two plants as the leading producer of tripoli.

### Metals and Other Minerals

Lead, zinc, copper, and silver continued to be recovered as byproducts of Illinois fluorspar production in 1989. The total value of extracted metals increased about 58 percent from 1988 to 1989. Lead production dropped 61 percent and its value 58 percent. Zinc production increased 19 percent and its value 64 percent in 1989. Ozark-Mahoning Company reactivated

the barite-recovery circuit at its Rosiclare mill. No estimate was given for silver and copper for 1989. Peat production declined 8.5 percent and value 11.1 percent. Illinois ranked fourth nationally of 22 peat-producing states. The output of gemstones remained unchanged.

### **Minerals Processed**

Preliminary data for 1989 are not yet available for most of the minerals processed in Illinois. The American Iron and Steel Institute reported that Illinois raw-steel production dropped to 7,516,677 net tons, about a 3-percent decrease. The Zinc Corporation of America, formerly New Jersey Zinc Company, announced the reopening of its De Pue zinc-dust plant in mid-May for a 2-month period. The plant was idled in December 1988. Approximately 14 persons were recalled at De Pue, which produces a special-grade zinc dust that cannot be produced at the company's Monaco, Pennsylvania, plant. The company had not announced future plans for De Pue as of this writing.

### **Products Manufactured from Minerals**

Preliminary figures for 1989 show increases of about 13 percent in the production and value of portland cement. Masonry cement production and value both dropped about 80 percent. Illinois ranked eighth nationally in shipments of portland cement and 30th in shipments of masonry cement. A bright spot for the cement industry is the continued work on Chicago-area expressways and the high level of construction along the lake front. About 40 percent of the coal and petroleum coke used to fire kilns at the Lone Star Industries Inc. Oglesby cement plant will be replaced by solvent wastes.

Lime sales and value increased in 1989 for the third consecutive year. Sales rose 8 percent and value 13 percent. These gains were attributed to the increase in demand by the steel industry. Lime production could increase dramatically with the passage of acid-rain legislation, which requires drastic reductions in sulfur-dioxide emissions from electric utilities. Lime is used by utilities in desulfurization systems and also to stabilize sludges from sewage and desulfurization plants prior to disposal. Lime is also being considered as an ingredient in a substitute for salt used in deicing roads and highways. The substitute, calcium magnesium acetate, may cause less harm to the environment and roads than does common salt.

TABLE 1 Illinois minerals extracted, processed, and manufactured into products, 1986-88: production and value<sup>a</sup>

Minerals	Unit	Quantity	Value (\$1000)	Average unit <sup>b</sup> value (\$)	Value (\$1000)	Quantity	Average unit <sup>b</sup> value (\$)	Value (\$1000)	1988	
									1986	1987
<b>EXTRACTED</b>										
FUELS <sup>c</sup>										
Coal	thousand tons	63,233	1,896,367	29.99	60,761	1,796,106	29.56	59,852	1,708,786	28.55
Crude oil	thousand bbl	27,245	400,498	14.70	24,096	421,685	17.50	22,476	332,422	14.79
Natural gas	million cu ft	1,887	4,851	2.57	1,371	3,071	2.24	1,471	3,221	2.19
<b>TOTAL<sup>d</sup></b>		2,301,716			2,220,862				2,044,429	
<b>INDUSTRIAL AND CONSTRUCTION MATERIALS<sup>b</sup></b>										
Clay - common	thousand tons	283	1,092	3.86	233	977	4.19	180	704	3.90
Sand and gravel										
Common	thousand tons	27,867	82,523	2.96	28,300	93,300 <sup>e</sup>	3.30 <sup>e</sup>	30,098	93,504	3.11
Industrial	thousand tons	4,037	52,133	12.91	4,346	45,547	10.48	4,328	56,142	12.96
Stone (limestone & dolomite)										
Crushed & broken	thousand tons	44,200 <sup>e</sup>	179,600 <sup>e</sup>	4.06 <sup>e</sup>	52,102	216,212	4.15	57,900 <sup>e</sup>	251,200 <sup>e</sup>	4.34 <sup>e</sup>
Dimension	thousand tons	2 <sup>e</sup>	107 <sup>e</sup>	53.50 <sup>e</sup>	W	W	1 <sup>e</sup>	W	129 <sup>e</sup>	109.75 <sup>e</sup>
<b>TOTAL<sup>d</sup></b>		315,455			356,036				401,679	
<b>Metals, Gemstones and other undisclosed<sup>c</sup></b>										
Total value of mineral materials <sup>d</sup>		2,656,560	39,389		43,244				46,058	
					2,620,142				2,492,166	
<b>PROCESSED<sup>c</sup></b>										
Pig iron	thousand tons	2,379	356,490	149.86	W	W	W	NA	NA	NA
Sulfur	thousand tons	368	36,581	99.28	255	26,034	101.72	258	22,367	86.78
<b>TOTAL<sup>d</sup></b>		393,071			36,034	26,034			22,367	
Values that cannot be disclosed <sup>c</sup>		40,787			390,169				48,151	
Total value of mineral materials processed <sup>d</sup>		433,858			416,203				70,518	

TABLE 1 *continued*

Minerals	Unit	Quantity	Value (\$1000)	Average unit <sup>b</sup> value (\$)	Value (\$1000)	Quantity	Average unit <sup>b</sup> value (\$)	Value (\$1000)	1988	
									1986	1987
<b>MANUFACTURED INTO PRODUCTS<sup>c</sup></b>										
Cement (shipments)										
Portland	thousand tons	2,118	83,783	39.55	2,119	86,210	40.69	2,307	101,760	44.10
Clay products, estimated										
<b>TOTAL<sup>d</sup></b>			54,743			63,070				96,248
Values that cannot be disclosed <sup>e</sup>			138,526			149,280				198,008
Total value of mineral products manufactured <sup>c</sup>			39,196			40,615				47,217
<b>STATE TOTAL<sup>d</sup></b>			177,722			189,895				245,225
			<b>\$3,268,140</b>			<b>\$3,226,240</b>				<b>\$2,807,909<sup>f</sup></b>

<sup>a</sup>Sources: U.S. Bureau of Mines (USBM), Illinois Department of Mines and Minerals, Illinois State Geological Survey.

<sup>b</sup>Units used for reporting value are 1 barrel for oil, 1000 cubic feet for gas, 1 troy ounce for silver, and 1 ton for all other minerals and materials. Metals are reported in metric tons and other materials in short tons.

<sup>c</sup>EXTRACTED, Fuels - natural gas liquids

Industrial and construction materials - absorbent clay, fluorspar, dimension stone, tripoli  
Metals - lead, zinc, silver, copper  
Other - peat

PROCESSED - Natural gas liquids, expanded perlite, ground barite, calcined gypsum, exfoliated vermiculite, iron-oxide pigments, primary slab zinc, secondary slab zinc, columbium and tantalum, crude iodine, slag (iron and steel), pig iron  
MANUFACTURED - Masonry cement, lime, coke, glass

<sup>d</sup>Data may not add up to totals shown because of independent rounding.

<sup>e</sup>Estimate by USBM, no survey.

<sup>f</sup>Does not include pig iron. ISGS estimated value approximately \$375 million.

TABLE 2 Illinois mineral production compared to U.S. mineral production, 1987-88<sup>a</sup>

Commodity	Unit	Quantity	Illinois		United States		Illinois % of U.S. production
			Value (\$1,000)	Quantity	Value (\$1,000)	Quantity	
<b>1987</b>							
Coal	thousand tons	60,761	1,796,106	918,762	21,205,040	6,61	8.47
Crude oil	thousand bbls	24,096	4,224,10	3,047,378	46,960,095	0.79	0.90
Natural gas liquids	thousand bbls	NA	NA	NA	NA	—	—
Natural gas	million cu ft	1,371	3,071	17,348,537	28,888,630	0.01	0.01
Clays <sup>b</sup>	thousand tons	233	977	32,328	146,976	0.72	0.66
Sand and gravel	thousand tons	32,646	138,847	896,200	3,002,270	3.64	4.62
Stone (includes dimension stone)	thousand tons	52,102	216,212	1,051,000	4,403,690	4.96	4.91
Cement shipments (portland)	thousand tons	2,119	86,210	74,500	3,799,500	2.84	2.27
<b>1988</b>							
Coal	thousand tons	59,852	1,708,786	946,545	20,890,248	6.32	8.18
Crude oil	thousand bbls	22,476	332,422	2,979,123	34,477,367	0.75	0.96
Natural gas	million cu ft	1,334	2,927	17,808,313	30,395,961	0.01	0.01
Clays <sup>b</sup>	thousand tons	180	704	32,036	145,047	0.56	0.49
Sand and gravel	thousand tons	34,426	149,646	880,350	3,081,225	3.91	4.86
Stone (includes dimension stone)	thousand tons	59,075	251,329	1,221,189	5,808,289	4.84	4.33
Cement shipments (portland)	thousand tons	2,307	101,760	76,867	3,774,170	2.27	2.70

<sup>a</sup> Sources: U.S. Bureau of Mines, Illinois State Geological Survey, Illinois Department of Mines and Minerals, and American Petroleum Institute.<sup>b</sup> Excluding fuller's earth.<sup>c</sup> Estimated.

NA = not available.

TABLE 3 Minerals extracted, processed, and manufactured by county in Illinois, 1988<sup>a</sup>

County	Approximate rank based on total value <sup>b</sup>	Minerals extracted in order of value <sup>c</sup>	Minerals processed, in order of value	Mineral products, in order of value
Adams	31	Stone, crude oil, natural gas	Iron oxide pigments	--
Alexander	42	Tripoli, sand/gravel	--	--
Bond	66	Sand/gravel, crude oil, clay	--	--
Boone	84	Sand/gravel, stone	--	--
Brown	77	Crude oil	--	--
Bureau	89	Sand/gravel	--	Clay products
Calhoun	96	Stone	--	--
Carroll	81	Stone	--	--
Cass	100	--	--	--
Champaign	68	Sand/gravel	--	--
Christian	13	Coal, crude oil, stone	--	--
Clark	49	Crude oil, stone, sand/gravel	--	--
Clay	36	Crude oil, stone	--	--
Clinton	9	Coal, crude oil, natural gas,	--	--
Coles	46	Stone, crude oil, sand & gravel, natural gas,	--	--
Cook	6	Stone, sand/gravel	Expanded perlite, slag, pig iron <sup>d</sup> , secondary slab zinc <sup>e</sup>	Lime, coke <sup>g</sup>
Crawford	16	Crude oil, sand/gravel	Sulfur	Clay products
Cumberland	85	Sand/gravel, crude oil	--	--
De Kalb	54	Stone, sand/gravel	--	--
De Witt	88	Crude oil	--	--
Douglas	30	Coal, stone, crude oil	Natural gas liquids <sup>h</sup>	--
Du Page	61	Sand/gravel	Exfoliated vermiculite	Glass <sup>g</sup>
Edgar	83	Crude oil, natural gas	--	--
Edwards	45	Crude oil	--	--
Effingham	55	Crude oil, natural gas, sand/gravel	--	--
Fayette	35	Crude oil, stone, sand/gravel, natural gas	--	--
Ford	92	Sand/gravel	--	--
Franklin	2	Coal, crude oil	--	--
Fulton	39	Coal, sand/gravel	--	--
Gallatin	14	Coal, crude oil, sand/gravel, natural gas	--	--
Greene	90	Stone	--	--
Grundy	70	Sand/gravel	--	--
Hamilton	50	Crude oil, coal	--	--
Hancock	71	Stone, crude oil	--	--
Hardin	29	Fluorspar, stone, zinc, lead copper, silver, gemstones, germanium <sup>g</sup>	Ground/crushed barite <sup>g</sup>	--
Henderson	79	Stone, sand/gravel	--	--
Henry	94	Stone, sand/gravel	--	--
Iroquois	101	--	--	--
Jackson	10	Coal, stone, sand/gravel, crude oil	--	--
Jasper	44	Crude oil	--	--
Jefferson	5	Coal, crude oil	--	--
Jersey	97	Stone	--	--
Jo Daviess	78	Stone, sand/gravel	--	--
Johnson	65	Stone	--	--
Kane	23	Sand/gravel, stone <sup>i</sup>	--	Clay products
Kankakee	47	Stone, sand/gravel, clay	--	--
Kendall	69	Stone, sand/gravel	--	Clay products
Knox	27	Sand/gravel	--	--
Lake	38	Sand/gravel, peat	Calcined gypsum, crude iodine <sup>g</sup> , columbium <sup>g</sup>	Clay products
La Salle	8	Industrial sand, sand/gravel, stone, clay	Exfoliated vermiculite, expanded perlite	Portland cement, clay products, masonry cement, glass <sup>g</sup>

TABLE 3 *continued*

County	Approximate rank based on total value <sup>b</sup>	Minerals extracted in order of value <sup>c</sup>	Minerals processed, in order of value	Mineral products, in order of value
Lawrence	19	Crude oil, sand/gravel	--	--
Lee	25	Stone	--	Portland/masonry cement
Livingston	41	Stone, clay, sand/gravel	--	--
Logan	24	Coal, stone, sand/gravel	--	Glass <sup>e</sup>
Macon	60	Sand/gravel, crude oil,	--	Glass <sup>e</sup>
Macoupin	11	Coal, stone, crude oil	--	--
Madison	37	Stone, crude oil, sand/gravel	Sulfur, slag <sup>d</sup> , pig iron <sup>d</sup>	Clay products, coke <sup>d</sup> , glass <sup>d</sup>
Marion	33	Crude oil	Secondary slab zinc <sup>e</sup>	Glass <sup>d</sup>
Marshall	57	Sand/gravel	--	--
Mason	51	Industrial sand	--	--
Massac	22	--	--	Portland & masonry cement
McDonough	34	Coal, stone, crude oil	--	Clay products
McHenry	26	Sand/gravel	--	--
McLean	73	Sand/gravel	--	Fiberglass <sup>e</sup>
Menard	75	Stone	--	--
Mercer	91	Stone	--	--
Monroe	74	Stone, crude oil	--	--
Montgomery	58	Stone, crude oil	--	Glass <sup>d</sup>
Morgan	82	Natural gas, crude oil	--	--
Moultrie	98	Crude oil, sand/gravel	--	--
Ogle	40	Industrial sand, stone	--	--
Peoria	56	Sand/gravel, stone	Slag <sup>d</sup>	--
Perry	1	Coal, crude oil	--	--
Piatt	93	Sand/gravel, crude oil	--	--
Pike	62	Stone, sand/gravel, natural gas	--	--
Pope	99	Fluorspar <sup>d</sup> , lead <sup>d</sup> , zinc <sup>d</sup> , silver <sup>d</sup>	--	--
Pulaski	21	Clay, stone, sand/gravel	--	Clay products
Putnam	95	Sand/gravel	--	--
Randolph	3	Coal, stone, sand/gravel, crude oil	--	--
Richland	43	Crude oil	--	--
Rock Island	64	Stone, sand/gravel	--	--
St. Clair	18	Coal, stone, sand/gravel, crude oil, natural gas	Iron-oxide pigments, ground barite <sup>d</sup> , Primary slab zinc <sup>e</sup>	Glass <sup>e</sup>
Saline	4	Coal, crude oil, natural gas	--	--
Sangamon	63	Crude oil, sand/gravel,	Iron-oxide pigments	--
Schuyler	32	Coal, crude oil, stone, natural gas	--	--
Scott	87	Stone	--	--
Shelby	86	Crude oil, stone	--	--
Stark	102	--	--	--
Stephenson	67	Stone, sand/gravel	--	--
Tazewell	80	Sand/gravel	--	--
Union	53	Stone	--	--
Vermilion	52	Stone, sand/gravel	--	--
Wabash	7	Coal, crude oil, sand/gravel	--	--
Warren	76	Stone	--	--
Washington	15	Coal, crude oil, stone	--	--
Wayne	28	Crude oil, natural gas	--	--
White	12	Coal, crude oil, sand/gravel	--	--
Whiteside	59	Peat, stone, sand/gravel	--	--
Will	17	Stone, sand/gravel	Sulfur, expanded perlite	Glass <sup>e</sup>
Williamson	20	Coal, crude oil	--	--
Winnebago	58	Stone, sand/gravel	--	--
Woodford	72	Sand/gravel	--	--
Undistributed		Crude oil, stone	--	--

<sup>a</sup>Sources: U.S. Bureau of Mines, Illinois Department of Mines and Minerals, and Illinois State Geological Survey.<sup>b</sup>Since some values are not available by county, ranking cannot be exact.<sup>c</sup>Stone production; 1988 data were estimated to rank each county.<sup>d</sup>Pig iron not available by county.<sup>e</sup>Including dimension stone.<sup>f</sup>Value unknown; not included in total.<sup>g</sup>Pope County fluorspar and metal values included in Hardin County.

TABLE 4 Employment and wages in the Illinois mineral industry, 1987-88<sup>a</sup>

	1987				1988			
	No. of employees (1000)	Average weekly earnings (\$)	Average hours worked/week	Average hourly earnings (\$)	No. of employees (1000)	Average weekly earnings (\$)	Average hours worked/week	Average hourly earnings (\$)
Mining	23.4	606.60	39.1	15.44	21.1	651.84	39.9	16.34
Bituminous coal	14.2	655.45	38.1	17.21	12.3	722.86	39.7	18.21
Oil and gas extraction	4.3	515.56	39.6	13.03	4.0	534.49	38.8	13.77
Other	4.9	544.93	42.5	12.46	4.8	567.63	41.3	13.72
Processing	60.1	568.55	43.3	13.17	61.3	587.11	43.8	13.42
Primary metal industries	53.8	561.44	43.6	12.89	55.1	577.81	44.0	13.13
Petroleum refining	6.3	629.27	40.5	15.53	6.2	669.79	41.9	15.99
Manufacturing	32.5	494.42	41.0	12.08	34.6	502.30	41.7	12.13
Glass and glass products	6.4	488.31	40.3	12.13	6.4	493.07	40.3	12.23
Cement and clay products	3.3	417.27	41.2	10.13	3.4	426.36	41.4	10.30
Other stone and clay, glass	14.4	455.31	41.5	10.97	16.2	451.84	42.2	10.70
Petroleum and coal products	8.4	596.41	40.6	14.69	8.6	634.23	42.0	15.12

<sup>a</sup>Source: Illinois Department of Labor, Bureau of Employment Security.

TABLE 5 Minerals consumed in Illinois, 1987-88<sup>a</sup>

Commodity	Unit	1987			1988		
		U.S.	Illinois	Illinois % of U.S. consumption	U.S.	Illinois	Illinois % of U.S. consumption
<b>Fuels</b>							
Coal	million tons	842.5	35.4	4.20	853.9	32.9	3.85
Coke	million tons	29.4	NA	—			
Distillate fuel oils	million bbl	1,086.0	34.1	3.14	1,143.0	33.7	2.95
Gasoline	million bbl	3,145.0	112.4	3.57	3,225.0	120.3	3.73
Kerosene	million bbl	35.0	0.3	0.76	35.0	0.3	0.85
LPG and ethane	million bbl	588.0	42.3	7.19	606.0	46.6	7.69
Natural Gas	trillion cu ft	17.1	0.9	5.09	18.0	1.0	5.36
Residual fuel oil	million bbl	462.0	7.1	1.54	504.0	6.2	1.23
<b>Metals</b>							
Pig iron	million tons	50.0	2.6	5.15	55.0	NA	—
Lead	thousand tons	1,230.4	72.0	5.85	1,230.7	74.2	6.03
Zinc (slab)	thousand tons	798.1	131.5	16.48	829.2	139.8	16.86
<b>Construction materials</b>							
Air-cooled slag	million tons	13.5	NA	—	14.4	NA	—
Asphalt and road oil	million bbl	170.0	6.1	3.59	171.0	5.1	2.98
Cement	million tons	92.7	3.6	3.92	92.0	3.7	3.99
Sand and gravel	million tons	896.2	28.3	3.16	923.4	30.1	3.26
Stone	million tons	1,200.1	52.1	4.34	1,247.8	57.9	4.64
<b>Agricultural and chemical materials</b>							
Feldspar	thousand tons	720.0	28.7	3.99	730.0	29.7	4.07
Fluorspar	thousand tons	598.4	NA	—	607.4	NA	—
Lime <sup>b</sup>	thousand tons	15,758.0	606.0	3.85	17,318.0	648.0	3.74
Salt							
Evaporated	thousand tons	7,707	439.0	5.70	7,852.0	469.0	5.97
Rock	thousand tons	14,470	1,002.0	6.92	16,040.0	1,453.0	9.06

<sup>a</sup>Source: U.S. Bureau of Mines, U.S. Department of Energy.<sup>b</sup>Excludes regenerated lime.

NA = not available.

TABLE 6 Fuels and energy consumed in Illinois, 1987-88<sup>a</sup>

Fuel	Units	1987	1988	1987-88 (%)	Change		Trillion Btu <sup>b</sup>	
					1987 <sup>c,e</sup>	1988 <sup>d</sup>	1987 <sup>c,e</sup>	1988 <sup>d</sup>
Coal	thousand tons	35,362	32,882	- 7.0	760.9	701.7		
Natural gas	million ft <sup>3</sup>	873,436	965,388	+ 10.5	900.5	995.3		
Gasoline	thousand bbl	112,409	120,256	+ 7.0	590.5	631.7		
Kerosene	thousand bbl	267	315	+ 18.0	1.5	1.8		
Distillate fuel oil	thousand bbl	34,129	33,662	- 1.4	198.8	196.1		
Residual fuel oil	thousand bbl	7,127	6,194	- 13.1	44.8	38.9		
Liquid petroleum gases	thousand bbl	42,328	46,634	+ 10.2	154.9	170.3		
Hydropower	million kWh	107	65	- 39.3	1.1	0.7		
Nuclear power	million kWh	50,194	69,166	+ 37.8	540.9	743.1		
<b>TOTAL</b>					<b>3,193.9</b>	<b>3,479.6</b>		
Illinois percentage of total U.S. energy consumption					4.4	4.5		
Percentage of total energy consumed in Illinois								
Coal					23.82	20.17		
Natural gas					28.19	28.60		
Oil products					31.01	29.85		
Nuclear power					16.94	21.36		
Hydropower					<u>0.04</u>	<u>0.02</u>		
					<b>100.00</b>	<b>100.00</b>		

<sup>a</sup> Source: U.S. Department of Energy, Energy Information Administration.<sup>b</sup> Fuel conversion factors: gasoline—5,253,000 Btu/bbl; kerosene—5,670 Btu/bbl; distillate fuel oil—5,825,000 Btu/bbl; residual fuel oil—6,287,000 Btu/bbl.<sup>c</sup> 1987 fuel conversion factors: coal—21,517,000 Btu/ton; natural gas—1,031 Btu/Mcf; LPG—3,659,000 Btu/bbl; nuclear power—10,776 Btu/kWh; hydropower—10,253 Btu/kWh.<sup>d</sup> 1988 fuel conversion factors: coal—21,340,000 Btu/ton; natural gas—1,031 Btu/Mcf; LPG—3,658,000 Btu/bbl; nuclear power—10,743 Btu/kWh; hydropower—10,253 Btu/kWh.<sup>e</sup> Revised.

TABLE 7 Coal production in Illinois counties, 1987-88<sup>a</sup>

County	1987 Production						1988 Production			
	No. of mines	Underground (tons)	Surface (tons)	Total (tons)	Value <sup>b</sup>	No. of mines	Underground (tons)	Surface (tons)	Total (tons)	Value <sup>b</sup>
Christian <sup>c</sup>	1	2,159,510	—	2,159,510	63,835,116	1	1,888,895	—	1,888,895	53,927,952
Clinton	1	3,153,954	—	3,153,954	93,230,880	1	2,987,289	—	2,987,289	85,287,101
Douglas	1	983,779	—	983,779	29,080,507	1	770,379	—	770,379	21,994,320
Franklin	4	7,571,337	—	7,571,337	223,808,722	4	8,790,972	—	8,790,972	250,982,251
Fulton	1	—	625,905	625,905	18,501,752	1	—	506,570	506,570	14,462,573
Gallatin	3	1,320,822	463,599	1,784,421	52,747,485	3	1,464,761	560,180	2,024,941	57,812,066
Hamilton	1	595,351	—	595,351	17,598,575	1	42,239	—	42,239	1,205,923
Jackson	1	—	2,803,052	2,803,052	82,858,217	1	—	2,738,233	2,738,233	78,176,552
Jefferson	2	3,425,697	—	3,425,697	101,263,603	2	4,033,354	—	4,033,354	115,152,257
Logan	1	1,044,718	—	1,044,718	30,881,864	1	1,101,933	—	1,101,933	31,460,187
Macoupin	3	3,406,262	—	3,406,262	100,689,105	2	2,629,844	—	2,629,844	75,082,046
McDonough	1	—	456,988	456,988	13,508,565	1	—	490,101	490,101	13,992,384
Perry	6	—	11,047,853	11,047,853	326,000,535	6	—	11,026,514	11,026,514	314,806,975
Randolph	4	4,192,962	1,247,100	5,440,062	160,808,233	4	4,520,635	1,272,300	5,792,935	165,388,294
St. Clair	1	1,077,573	—	1,077,573	31,853,058	1	1,149,546	—	1,149,546	32,819,538
Saline	8	3,925,418	1,770,672	5,696,090	168,376,420	6	4,493,363	1,142,151	5,635,514	160,893,925
Schuylerville	1	—	762,704	762,704	22,545,530	1	—	796,289	796,289	22,734,051
Wabash	1	2,957,464	—	2,957,464	87,422,636	1	2,909,845	—	2,909,845	83,076,075
Washington	1	1,610,800	—	1,610,800	47,615,248	1	1,621,900	—	1,621,900	46,305,245
White	1	1,437,785	—	1,437,785	42,500,925	1	1,455,291	—	1,455,291	41,548,558
Williamson <sup>d</sup>	4	325,038	2,395,025	2,720,063	80,405,062	3	23,551	1,436,249	1,459,800	41,677,290
<b>TOTAL:</b>	<b>47</b>	<b>39,188,470</b>	<b>21,572,898</b>	<b>60,761,368</b>	<b>1,796,106,038</b>	<b>43</b>	<b>39,883,797</b>	<b>19,968,587</b>	<b>59,852,384</b>	<b>1,708,755,563</b>

<sup>a</sup>Production figures from Illinois Department of Mines and Minerals, Annual Coal, Oil and Gas Report.<sup>b</sup>Value calculated at an average of \$29.56/ton for 1987 and \$28.55/ton for 1988.<sup>c</sup>One mine operated at junction of Christian, Montgomery, and Sangamon Counties; all production placed in the county where tipple is located.<sup>d</sup>One mine operated at junction of Williamson and Saline Counties; all production placed in county where tipple is located.

TABLE 8 Coal production in Illinois counties, 1833-1988<sup>a</sup>

County	Cumulative total surface production (tons)	Cumulative total production (tons)	County	Cumulative total surface production (tons)	Cumulative total production (tons)
Adams	338,147	341,924	Macoupin	—	323,489,196
Bond	—	7,355,569	Madison	37,843	164,295,772
Brown	41,761	74,068	Marion	—	39,247,722
Bureau	11,094,808	53,823,055	Marshall	4,779	12,516,141
Calhoun	—	96,247	McDonough	3,255,179	5,863,660
Cass	—	212,477	McLean	—	5,544,139
Christian	—	347,613,876	Menard	—	13,462,005
Clark	4,482	4,482	Mercer	67,080	15,519,862
Clay	801	801	Monroe	—	8,284
Clinton	—	65,269,050	Montgomery	—	141,824,660
Coles	—	198,932	Morgan	13,564	190,787
Crawford	17,315	45,400	Moultrie	—	2,032,236
Douglas	—	41,730,786	Peoria	32,702,938	96,718,740
Edgar	207,242	915,698	Perry	349,235,945	447,904,630
Effingham	—	796	Pike	2,224	5,081
Franklin	—	673,086,387	Pope	34,704	36,266
Fulton	238,556,083	315,151,469	Putnam	—	10,071,893
Gallatin	9,116,570	41,860,383	Randolph	98,644,101	212,150,263
Greene	71,090	693,191	Richland	35	154
Grundy	1,635,422	40,872,430	Rock Island	—	3,846,169
Hamilton	—	6,172,927	St. Clair	116,444,567	366,094,027
Hancock	459,329	771,281	Saline	61,015,721	291,119,471
Hardin	—	40	Sangamon	—	233,449,607
Henry	9,065,783	22,910,053	Schuylerville	8,585,114	10,288,530
Jackson	58,371,451	126,044,363	Scott	3,790	612,476
Jasper	—	23,739	Shelby	925	4,119,763
Jefferson	5,353,358	149,673,362	Stark	8,342,056	9,569,336
Jersey	2,290	120,350	Tazewell	—	17,633,802
Johnson	72,781	314,325	Vermilion	30,651,670	165,878,433
Kankakee	18,284,342	19,192,105	Wabash	12,082	31,538,684
Knox	62,601,174	65,896,605	Warren	132	685,466
La Salle	2,345,878	65,547,638	Washington	—	29,227,637
Livingston	139,091	10,111,437	White	—	6,981,202
Logan	—	19,840,183	Will	29,333,708	37,553,733
Macon	—	11,000,468	Williamson	98,340,401	455,273,986
			Woodford	—	7,810,160
Total cumulative surface production, 1911-1988	1,254,507,756		Estimated production, all counties, 1833-1881		73,386,123
Total cumulative production, 1882-1988	5,249,529,870		Total cumulative production, 1833-1988		5,322,915,993

<sup>a</sup> Source: Illinois State Department of Mines and Minerals, Annual Coal, Oil and Gas Reports. This table has been revised with production placed in county where tipple is located.

TABLE 9 Employment and production by method of coal mining in Illinois, 1977-88<sup>a</sup>

Year	Underground				Surface			
	No. of mines	No. of employees	Average production/mine (tons)	Average no. employees/mine	No. of mines	No. of employees	Average production/mine (tons)	Average no. employees/mine
1977	25	11,375	1,183,559	455	45	4,739	539,810	105
1978	28	12,620	888,914	451	43	5,241	554,757	122
1979	31	13,200	1,054,233	426	40	5,299	671,422	132
1980	31	13,219	1,128,022	426	35	5,065	787,821	145
1981	31	13,351	943,081	431	27	4,797	835,672	178
1982	32	10,554	1,115,121	330	28	4,397	919,439	157
1983	31	10,514	1,076,464	339	23	4,245	1,087,096	185
1984	31	10,857	1,288,564	350	21	3,946	1,206,843	188
1985	32	11,386	1,207,769	356	20	3,445	1,091,432	172
1986	31	10,379	1,320,375	335	20	3,170	1,115,084	159
1987	28	9,263	1,399,588	331	19	2,925	1,135,416	154
1988	27	8,830	1,477,178	327	16	2,684	1,248,037	168

<sup>a</sup>Source: Illinois Department of Mines and Minerals, Annual Coal, Oil and Gas Report.

TABLE 10 Coal production of Illinois companies, 1987-88<sup>a</sup>

Rank	Company	No. of mines		Production (tons)	Percentage of total production	No. of employees	Rank	No. of mines		Production (tons)	Percentage of total production	No. of employees
		Under-ground	Surface					Under-ground	Surface			
1	Pearbody Coal	5	2	9,552,275	15.72	2,449	3	5	1	8,726,403	14.58	2,099
2	Consolidation Coal	2	3	8,751,152	14.40	1,294	1	2	3	9,267,916	15.48	1,114
3	Old Ben Coal	4	0	7,571,337	12.46	1,454	2	4	0	8,790,972	14.69	1,534
4	Arch of Illinois	0	2	5,661,485	9.32	763	4	0	3	6,908,107	11.54	895
5	AMAX Coal	2	1	5,471,904	9.01	1,186	6	2	1	4,503,193	7.52	1,051
6	Monterey Coal	2	0	4,978,613	8.19	1,166	5	2	0	4,715,303	7.88	1,145
7	Freeman United Coal Mining	4	2	4,128,493	6.79	952	8	2	2	3,055,248	5.10	920
8	Zeigler Coal	3	0	3,424,862	5.64	569	7	3	0	3,585,157	5.99	555
9	Kerr-McGee Coal	1	0	2,216,402	3.65	508	9	1	0	2,471,963	4.13	556
10	Pipestone Greek Mining	0	1	1,694,452	2.79	200						
11	White County Coal	1	0	1,437,785	2.37	233	10	1	0	1,455,291	2.43	237
12	Sahara Coal	1	1	1,056,313	1.74	449	11	1	1	1,203,026	2.01	443
13	Turris Coal	1	0	1,044,718	1.72	274	13	1	0	1,101,933	1.84	280
14	Kenellis Energies	1	0	930,524	1.53	253	12	1	0	1,171,947	1.96	250
15	Black Beauty	0	1	762,704	1.25	118	14	0	1	796,289	1.33	114
16	Midland Coal	0	1	625,905	1.03	135	17	0	1	506,570	0.85	104
17	Equality Mining	0	1	583,393	0.96	42	16	0	1	555,820	0.93	42
18	Jader Coal	0	1	463,599	0.76	67	15	0	1	560,180	0.94	73
19	Arclar Company <sup>b</sup>	1	0	242,490	0.40	47	18	1	0	376,856	0.63	80
20	Ace Diggin, Inc.	0	1	116,735	0.19	15	19	0	1	75,659	0.13	16
21	J. J. Truck Mining	0	1	34,137	0.06	5						
22	Williamson Coal	0	1	12,090	0.02	9						
-	Lorenzo Mining	-	-	-	-	-	20	1	0	23,551	0.04	6
TOTAL		28	19	60,761,368	100.00	12,188	27	16	59,852,384	100.0	11,514	

<sup>a</sup>Source: Illinois Department of Mines and Minerals, Annual Coal, Oil and Gas Report.

<sup>b</sup>Was TekBar Industries; now Arclar Company.

TABLE 11 Coal shipped from Illinois to other states, 1984-88<sup>a</sup>

Consumers	Wisconsin	(1,000 tons)						Illinois	Total
		Minnesota & Michigan	Iowa	Missouri	Indiana	Kentucky	Georgia & Florida	Other states <sup>b</sup>	
Electric utilities									
1984	2,516	328	1,115	16,125	8,522	12	5,423	3,737	18,418
1985	1,216	269	1,959	13,419	7,653	117	6,854	4,840	16,541
1986	1,523	123	2,045	12,824	9,130	847	6,318	6,028	16,822
1987	1,757	296	1,621	12,945	9,282	61	9,140	2,364	15,909
1988	2,058	79	2,217	12,871	7,871	136	9,791	2,951	14,372
Coke and gas plants									
1984	—	—	3	2,222	—	—	1	—	272
1985	—	—	—	1,292	—	—	—	—	715
1986	—	—	10	1,536	—	—	—	—	281
1987	—	—	—	1,531	—	—	—	—	294
1988	—	—	—	1,414	—	—	e	—	94
Retail dealers									
1984	1	e	30	19	—	—	9	—	293
1985	—	—	14	89	1	—	e	24	186
1986	3	e	2	47	1	—	e	—	201
1987	—	—	11	44	4	—	17	—	200
1988	—	—	e	45	e	—	33	—	197
Others									
1984	721	169	543	940	290	—	46	6	1,852
1985	624	53	412	780	317	9	50	40	1,553
1986	341	46	177	835	204	—	186	7	1,692
1987	287	31	389	754	269	—	91	—	2,211
1988	260	7	313	740	223	—	120	7	2,587
Totals <sup>c</sup>									
1984	3,238	495	1,659	17,098	11,053	12	5,423	3,793	25 <sup>d</sup>
1985	1,872	322	2,385	14,288	9,262	125	6,854	4,889	117 <sup>d</sup>
1986	1,867	169	2,224	13,716	10,871	847	6,318	6,213	202 <sup>d</sup>
1987	2,044	326	2,020	13,743	11,087	61	9,140	2,472	345 <sup>d</sup>
1988	2,317	85	2,530	13,656	9,508	136	9,791	3,104	494 <sup>d</sup>

<sup>a</sup> Sources: U.S. Department of Energy, Coal Distribution, 1984-1988.<sup>b</sup> Includes AL (1984-1988), MS (1984-88), TN (1984-88), LA (1984-87), OH (1984 + 86-88<sup>e</sup>), PA (1984, 86<sup>e</sup>, 87-88), NY (1984<sup>e</sup>), KS (1984-88), TX (1984-88), CA (1984-88), SD (1984<sup>e</sup>), AR (1985-88), WV (1985<sup>e</sup>), MA (1986<sup>e</sup>-88<sup>e</sup>), ND (1986<sup>e</sup>), MT (1987<sup>e</sup>).<sup>c</sup> Totals may not add up because of independent rounding.<sup>d</sup> Includes shipments to foreign countries, with no breakdown by consuming sector: 19,000 tons in 1984, 44,000 tons foreign and 9,000 tons U.S. in 1985, 195,000 tons in 1986, 343,000 tons foreign, 2,000 U.S. in 1987, 487,000 tons in 1988.<sup>e</sup> = Quantity is less than 500 tons.

TABLE 12 Sources of coal consumed in Illinois, 1984-88<sup>a</sup>

Consumers	Illinois	Western Kentucky	Indiana	Southern West Virginia, <sup>c</sup> Virginia, and eastern Kentucky (1,000 tons)			Western interior <sup>d</sup> states	Western states <sup>e</sup>	Montana <sup>f</sup> and Washington	Pennsylvania	Total coal consumed in Illinois
				Ohio, eastern Pennsylvania, <sup>b</sup> and northern West Virginia	Ohio, eastern Pennsylvania, <sup>b</sup> and northern West Virginia	Ohio, eastern Pennsylvania, <sup>b</sup> and northern West Virginia					
<b>Electric utilities</b>											
1984	18,418	1,594	1,581	—	1,683	—	7,422	1,995	9	32,693	
1985	16,541	1,116	1,310	—	1,272	—	8,186	3,258	9	31,682	
1986	16,822	1,147	1,313	12	1,431	—	7,198	4,277	—	32,200	
1987	15,909	1,154	1,427	—	1,849	—	5,608	3,500	4	29,452	
1988	14,372	1,102	1,150	—	1,630	—	4,777	3,876	9	26,908	
<b>Coke and gas plants</b>											
1984	272	—	—	779	1,003	35	—	—	—	2,089	
1985	715	—	4	210	1,139	—	—	—	—	2,068	
1986	281	—	—	146	1,527	—	—	—	—	1,954	
1987	294	—	—	—	1,344	—	—	—	—	1,638	
1988	94	—	—	—	1,312	—	—	—	—	1,406	
<b>Retail dealers</b>											
1984	293	31	66	—	28	—	9	—	1	420	
1985	186	12	30	—	8	—	—	—	1	236	
1986	201	5	30	9	9	—	—	—	9	245	
1987	200	1	49	—	22	—	9	—	1	273	
1988	197	7	44	—	7	—	—	—	1	256	
<b>Others</b>											
1984	1,852	443	482	150	593	16	—	—	61	3,596	
1985	1,553	315	499	30	601	—	—	—	36	3,035	
1986	1,692	577	499	5	918	—	—	—	33	3,690	
1987	2,211	528	356	68	820	1	—	—	25	3,999	
1988	2,587	387	647	21	659	9	—	—	10	4,311	
<b>Total</b>											
1984	20,836	2,067	2,129	928	3,307	51	7,422	1,995	63	38,799	
1985	18,995	1,443	1,843	240	3,020	—	8,186	3,258	37	37,022	
1986	18,996	1,738	1,842	162	3,886	—	7,198	4,277	33	38,089	
1987	18,614	1,683	1,832	68	4,025	1	5,608	3,500	30	35,362	
1988	17,250	1,496	1,841	21	3,609	9	4,777	3,876	11	32,882	

<sup>a</sup>Sources: U.S. Department of Energy, Coal Distribution.<sup>b</sup>Includes Districts 1, 2, 3, 4, and 6 (MD, OH, eastern PA, northern WV).<sup>c</sup>Includes Districts 7, 8, and 13 (AL, GA, eastern KY, NC, TN, VA, southern WV).<sup>d</sup>Includes Districts 14 and 15 (AR, KS, MO, OK, TX).<sup>e</sup>Includes Districts 16, 17, and 19-21 (CO, ID, ND, NM, SD, UT, WY).<sup>f</sup>Includes Districts 22 and 23 (AK, MT, OR, WA).

g = Quantity is less than 500 tons.

TABLE 13 Crude-oil production in Illinois counties between 1888 and 1988; value for 1987 and 1988<sup>a</sup>

County	1888-1988 cumulative production (1000 bbl)	1987			1988			1987-88 percent change
		Production (1000 bbl)	% of total Illinois production	Value <sup>d</sup> (\$1000)	Production (1000 bbl)	% of total Illinois production	Value <sup>d</sup> (\$1000)	
Adams	279	3	0.0	49	4	0.0	60	+45.8
Bond	8,062	69	0.3	1,200	62	0.3	922	- 9.1
Brown	2,025	70	0.3	1,226	99	0.4	1,467	+41.7
Champaign	7	—	—	—	—	—	—	—
Christian	29,663	347	1.5	6,071	377	1.7	5,579	+ 8.7
Clark-Cumberland	94,226	241	1.0	4,209	210	0.9	3,110	-12.6
Clay	147,635	1,274	5.3	22,297	1,092	4.9	16,150	-14.3
Clinton	87,988	264	1.1	4,628	262	1.2	3,875	- 0.9
Coles	24,984	209	0.9	3,664	166	0.7	2,455	-20.7
Crawford	249,484	1,936	8.0	33,882	2,195	9.8	32,467	+13.4
De Witt	3,740	48	0.2	848	49	0.2	722	+ 0.7
Douglas	3,667	7	0.0	125	2	0.0	27	-74.1
Edgar	4,545	63	0.3	1,095	60	0.3	889	- 3.9
Edwards	56,266	635	2.6	11,106	579	2.6	8,566	- 8.7
Effingham	19,600	295	1.2	5,156	270	1.2	3,989	- 8.5
Fayette	410,055	1,365	5.7	23,886	1,222	5.4	18,070	-10.5
Franklin	80,360	876	3.6	15,325	947	4.2	14,010	+ 8.2
Gallatin	55,455	353	1.5	6,184	311	1.4	4,596	-12.1
Hamilton	137,685	371	1.6	6,491	310	1.4	4,583	-16.5
Jackson	100	8	0.0	139	5	0.0	78	-33.3
Jasper	60,016	763	3.2	13,356	616	2.7	9,112	-19.3
Jefferson	93,635	1,265	5.3	22,130	1,011	4.5	14,956	-20.0
Lawrence	420,222	2,584	10.7	45,228	2,911	13.0	43,046	+12.6
Macon	2,496	78	0.3	1,363	76	0.3	1,124	- 2.0
Macoupin	379	18	0.1	309	12	0.1	179	-31.5
Madison	18,610	100	0.4	1,758	97	0.4	1,427	- 4.1
Marion	433,044	2,198	9.1	38,465	1,326	5.9	19,607	-39.7
McDonough-								
Hancock <sup>c</sup>	5,691	1	0.0	26	1	0.0	18	-18.1
Monroe	90	6	0.0	103	13	0.1	184	+111.4
Montgomery	156	3	0.0	53	3	0.0	36	-19.7
Morgan	1	f	0.0	8	f	0.0	4	-38.9
Moultrie	131	3	0.0	58	3	0.0	44	-11.3
Perry	941	9	0.0	151	8	0.0	113	-11.5
Piatt	8	f	0.0	3	f	0.0	2	+ 3.2
Randolph	4,983	9	0.0	91	15	0.1	219	+62.6
Richland	111,241	771	3.2	13,495	626	2.8	9,254	-18.9
St. Clair	3,620	22	0.1	368	21	0.1	313	- 1.6
Saline	24,356	298	1.2	5,213	266	1.2	3,931	-10.8
Sangamon	5,078	84	0.3	1,288	103	0.5	1,524	+40.0
Schuyler	191	3	0.0	45	16	0.1	235	+514.2
Shelby	2,166	63	0.3	1,104	49	0.2	729	-21.9
Wabash	119,787	1,142	4.7	19,983	1,150	5.1	17,014	+ 0.7
Washington	35,490	383	1.6	6,695	340	1.5	5,032	-11.1
Wayne	274,483	1,920	8.0	33,602	1,740	7.7	25,742	- 9.4
White	314,339	2,223	9.2	38,899	2,094	9.3	30,974	- 5.8
Williamson	2,715	26	0.1	452	26	0.1	389	+ 1.8
Other <sup>b</sup>	15,208	1,702	7.1	29,785	1,731	7.7	25,597	- 1.7
Total <sup>e</sup>	3,364,888	24,096	100.0	421,685	22,476	100.0	332,420	- 6.7

<sup>a</sup> Source: Illinois State Geological Survey Oil and Gas Section<sup>b</sup> Could not be assigned to individual field or county.<sup>c</sup> No oil production reported for Hancock County in 1971-1978; 143 bbl was produced in 1987 and 120 bbl in 1988.<sup>d</sup> Value calculated at an estimated average price of \$17.50 per barrel for 1987 and \$14.79 per barrel for 1988.<sup>e</sup> May not add up because of independent rounding.<sup>f</sup> Less than 1,000 bbl.

TABLE 14 Crude-oil production from major fields (over 200,000 barrels per year) in Illinois, 1987-88\*

Field	County	1987		1988		1987-88 Change (%)
		Production (1000 bbl)	% of Ill. total	Production (1000 bbl)	% of Ill. total	
Lawrence	Lawrence Crawford	2,514.9	10.4	2,851.0	12.7	+ 13.4
Main Consolidated	Crawford Lawrence Jasper	1,930.1	8.0	2,144.0	9.5	+11.1
Clay City Consolidated	Clay Wayne Richland Jasper	2,657.4	11.0	2,109.2	9.4	- 20.6
Salem	Marion Jefferson	2,315.3	9.6	1,247.9	5.6	- 46.1
Louden	Fayette Effingham	1,383.3	5.7	1,243.5	5.5	- 10.1
New Harmony Consolidated	White Wabash Edwards	1,002.5	4.2	1,006.1	4.5	+ 0.4
Sailor Springs Consolidated	Clay Jasper Effingham	604.1	2.5	545.1	2.4	- 9.8
Phillipstown Consolidated	White Edwards	468.2	1.9	431.1	1.9	- 7.9
Allendale	Wabash Lawrence	403.9	1.7	337.3	1.5	- 16.5
Albion Consolidated	Edwards White	337.2	1.4	311.9	1.4	- 7.5
Johnsonville Consolidated	Wayne	b	—	285.4	1.3	—
Storms Consolidated	White	206.5	0.9	284.9	1.3	+38.0
Herald Consolidated	White Gallatin	346.8	1.4	256.8	1.1	- 26.0
Roland Consolidated	White Gallatin	292.9	1.2	252.6	1.1	- 13.8
Benton	Franklin	241.5	1.0	235.5	1.0	- 2.5
Dale Consolidated	Franklin Hamilton Saline	216.9	0.9	b	—	—
Divide Consolidated	Jefferson	289.3	1.2	b	—	—
Goldengate Consolidated	Wayne White	214.1	0.9	b	—	—
Mill Shoals	White Hamilton Wayne	223.8	0.9	b	—	—
Parkersburg	Edwards Richland	208.1	0.9	b	—	—
		15,856.8	65.8	13,542.2	60.3	- 14.6

\*Source: Illinois State Geological Survey Oil and Gas Section.

b = Less than 200,000 barrels of oil per year.

TABLE 15 Petroleum products consumed in Illinois, 1984-88<sup>a</sup>

	1984	1985	1986	1987	1988
	(1,000 bbl)				
Motor gasoline <sup>b</sup>	107,967	114,047	110,906	112,409	120,256
Kerosene	642	1,148	409	267	315
Distillate fuel oil	36,415	32,189	35,132	34,129	33,662
Residual fuel oil	11,821	7,250	9,156	7,127	6,194
Lubricants	3,391	3,160	3,090	3,493	3,369
Liquefied gases	31,310	33,891	36,627	42,328	46,634
Asphalt & road oil	5,727	7,500	6,185	6,130	5,076
Other <sup>c</sup>	21,107	19,834	20,440	22,290	24,944
Total	219,530	216,862	221,944	228,173	240,450

<sup>a</sup> Source: State Energy Data Report, U.S. DOE/EIA-0214.<sup>b</sup> Aviation and motor gasoline and jet fuel.<sup>c</sup> Includes natural gasoline, unfractionated stream, plant condensate, petrochemical feedstocks, special naphthas, non-electric utility sector use of petroleum coke, still gas, wax, unfinished oils, motor gasoline and aviation gasoline blending components, and miscellaneous products.TABLE 16 Natural-gas production in Illinois, 1981-88<sup>a</sup>

Year	Withdrawals		
	Gas wells	Oil wells (million cu ft)	Total
1981	1,103.6	191.4	1,295
1982	993.5	168.5	1,162
1983	858.0	172.0	1,030
1984	1,399.6	130.4	1,530
1985	1,228.0	96.0	1,324
1986	1,545.9	341.6	1,888
1987	1,215.2	155.8	1,371
1988	1,289.5	181.2	1,471

<sup>a</sup> Source: Illinois State Geological Survey Oil and Gas Section.

TABLE 17 Natural-gas production from large fields in Illinois counties, 1986-88<sup>a</sup>

Gas field	County	Production (million cu ft)			Change (%)	
		1986	1987	1988	1986-87	1987-88
Liberty	Adams	--	--	132.8	--	--
Stollerton	Clinton	256.1	167.7	75.6	- 34.5	- 54.9
Mattoon	Coles	266.4	315.0	226.9	+ 18.2	- 28.0
Main Consolidated	Crawford	169.3	sold	--	--	--
Ashmore East	Edgar	49.9	57.5	56.9	+ 15.2	- 1.0
Prentice	Morgan	210.7	165.0	505.6	- 21.7	+ 206.4
Fishhook	Pike	195.6	202.1	136.5	+ 3.3	- 32.4
Raleigh South	Saline	99.5	59.4	57.9	- 40.2	- 2.6
Rushville	Schuylerville	132.5	119.9	2.0	- 9.5	- 98.3
Keenville	Wayne	319.8	141.2	170.4	- 55.9	+ 20.7
Other <sup>b</sup>		187.7	143.2	106.0	- 23.8	- 25.9
TOTAL <sup>c</sup>		1,887.5	1,371.0	1,470.7	- 27.4	+ 7.3

<sup>a</sup>Source: Illinois State Geological Survey. Fields producing 50 million cu ft or more.

<sup>b</sup>Louden, Fayette and Effingham Counties; Eldorado East, Gallatin County; Eden, Randolph County; New Athens and St. Libory, St. Clair County; Eldorado Consolidated and Eldorado West, Saline County; Pittsburg, Williamson County (1986, 1987, 1988); Waggoner, Montgomery County (1986, 1987).

<sup>c</sup>Totals may not add up because of rounding.

TABLE 18 Natural gas consumed in Illinois, 1987-88<sup>a</sup>

Consumers	1987		1988		
	Quantity (million cu ft)	% of total consumption	Quantity (million cu ft)	% of total consumption	1987-88 change (%)
Residential	407,875	46.7	462,339	47.9	+13.4
Commercial	191,047	21.9	215,257	22.3	+12.7
Industrial	261,168	29.9	269,226	27.9	+ 3.1
Electric utilities	3,172	0.4	5,706	0.6	+79.9
Total delivered to consumers	863,261	98.8	952,529	98.7	+10.3
Other uses <sup>b</sup>	10,175	1.2	12,859	1.3	+26.4
Total consumption	873,436	100.0	965,388	100.0	+10.5

<sup>a</sup>Source: U.S. Department of Energy.

<sup>b</sup>Includes lease and plant fuel, pipeline fuel, and extraction loss.

TABLE 19 Production and value of Illinois sand and gravel by district<sup>a</sup>, 1988<sup>b</sup>

County			Companies	Operations	Total quantity (1000 ton)	Value (\$1000)
<b>District 1</b>						
Boone	Henry	Rock Island				
Bureau	Jo Davies	Stephenson				
Cook	Kane	Whiteside	44	56	19,067	60,445
De Kalb	Lake	Will				
Du Page	McHenry	Winnebago				
<b>District 2</b>						
Fulton	Logan	Sangamon				
Henderson	Peoria	Tazewell	20	25	2,281	7,541
Knox	Pike					
<b>District 3</b>						
Champaign	Kankakee	McLean				
Clark	Kendall	Moultrie				
Coles	La Salle	Piatt	42	52	6,475	19,368
Cumberland	Livingston	Putnam				
Ford	Macon	Vermilion				
Grundy	Marshall	Woodford				
<b>District 4</b>						
Alexander	Gallatin	Randolph				
Bond	Jackson	St. Clair				
Crawford	Lawrence	Wabash	21	22	2,275	6,150
Effingham	Madison	White				
Fayette	Pulaski					
Total			127 <sup>c</sup>	155	30,098	93,504

<sup>a</sup>See figure 9.<sup>b</sup>Source: U.S. Bureau of Mines.<sup>c</sup>There are 107 different companies, however, some operate in more than one county and have been counted more than once.TABLE 20 Illinois sand and gravel production<sup>a</sup> by size of operation, 1986 and 1988

Size of operation (tons/year)	1986			1988		
	No. of operations	Production <sup>a</sup> (1000 tons)	Percent of total	No. of operations	Production (1000 tons)	Percent of total
less than 25,000	44	435	1.6	36	293	1.0
25,000 to 49,999	17	636	2.3	21	748	2.5
50,000 to 99,999	27	2,061	7.4	33	2,451	8.1
100,000 to 199,999	18	2,611	9.4	26	3,630	12.1
200,000 to 299,999	15	3,698	13.2	18	4,464	14.8
300,000 to 399,999	7	2,369	8.5	4	1,403	4.7
400,000 to 599,999	5	2,581	9.3	6	2,744	9.1
600,000 to 799,999	4	2,598	9.3	3		
800,000 to 999,999	3	2,622	9.4	2	3,989	13.2
1,000,000 and over	6	8,258	29.6	6	10,376	34.5
Total	146	27,867	100.0	155	30,098	100.0

<sup>a</sup>Source: U.S. Bureau of Mines. Due to the canvassing procedure used for sand and gravel production, 1987 information will not be available.

TABLE 21 Use of sand and gravel produced in Illinois, 1986 and 1988<sup>a</sup>

	1986		1988		1986-1988 change in quantity (%)	1986-88 change in value (%)		
	Quantity (1000 tons)	Value (\$1000)	Quantity (1000 tons)	Value (\$1000)				
<b>Construction aggregates</b>								
<b>Sand and gravel</b>								
<b>Construction operations</b>								
Building	6,825	21,006	10,287	30,774	+50.7	+46.5		
Paving	5,964	20,879	7,589	29,320	+27.3	+40.4		
Fill	2,984	6,717	4,120	9,896	+38.1	+47.3		
Other uses <sup>b</sup>	12,094	33,921	8,102	23,514	-33.0	-30.7		
<b>Total<sup>c</sup></b>	<b>27,867</b>	<b>82,523</b>	<b>30,098</b>	<b>93,504</b>	<b>+ 8.0</b>	<b>+13.3</b>		
<b>Industrial sand</b>								
Sand blasting	200	3,138	NA	NA	--	--		
Molding	793	10,571	NA	NA	--	--		
Glass	1,476	12,939	NA	NA	--	--		
Other uses <sup>d</sup>	1,570	25,485	NA	NA	--	--		
<b>Total<sup>c</sup></b>	<b>4,039</b>	<b>52,133</b>	<b>4,328</b>	<b>56,142</b>	<b>+ 7.2</b>	<b>+ 7.7</b>		
<b>Total sand and gravel<sup>e</sup></b>	<b>31,906</b>	<b>134,656</b>	<b>34,426</b>	<b>149,646</b>	<b>+ 7.9</b>	<b>+11.1</b>		

<sup>a</sup>Source: U.S. Bureau of Mines.

<sup>b</sup>Includes railroad ballast and other unspecified materials

<sup>c</sup>Numbers are rounded and totals may not add up.

<sup>d</sup> Includes railroad traction, filtration, grinding and polishing, pottery, abrasives, chemicals, enamel, propping sand for hydrofracturing oil wells, and other uses.

TABLE 22 Portland cement manufactured in Illinois, 1987-88<sup>a</sup>

	1987	1988	Change (%)
			1987-88
No. of active plants	4	4	-
Production (tons)	1,730,895	2,032,647	+ 17.4
<b>Shipments from mills</b>			
Quantity (tons)	2,118,512	2,307,411	+ 8.9
Value (\$)	86,209,855	101,759,933	+ 18.0
Average value/ton	40.69	44.10	+ 8.4
<b>Stocks at mills, Dec. 31</b>			
(tons)	145,714	195,502	+ 34.2

<sup>a</sup>Source: U.S. Bureau of Mines.

TABLE 23 Mineral production data for 1988 compared to preliminary data for 1989<sup>a</sup>

Minerals extracted	Unit	1988		1989		Percentage of change from 1988 to 1989	
		Quantity	Value (\$ 1000)	Quantity	Value (\$ 1000)	Quantity	Value
<b>Fuels</b>							
Coal	thousand tons	59,852	1,708,786	60,131	1,683,669 <sup>b</sup>	+ 0.5	- 1.5
Crude oil	thousand bbl	22,476	332,422	20,567 <sup>b</sup>	375,965 <sup>b</sup>	- 8.5	+ 13.1
Natural gas	thousand Mcf	1,471	3,221	1,477 <sup>b</sup>	3,175 <sup>b</sup>	+ 0.4	- 1.4
<b>Industrial and construction materials</b>							
Stone <sup>c</sup>	thousand tons	57,901	251,329	61,700	262,200	+ 4.4	+ 4.3
Sand and gravel	thousand tons	34,426	149,646	38,520	164,100	+ 11.9	+ 9.7
Clay <sup>d</sup>	thousand tons	180	704	174	710	- 3.3	+ 0.9
Metals, gemstones and other undisclosed <sup>e</sup>			46,058		49,705		+ 7.9
<b>Total value of minerals extracted</b>			<b>\$2,492,166</b>		<b>\$2,539,524</b>		+ 1.9

<sup>a</sup>Source: U.S. Bureau of Mines and Illinois Department of Mines and Minerals<sup>b</sup>Estimated by Illinois State Geological Survey<sup>c</sup>Dimension stone included with values that cannot be disclosed because 1989 must be concealed.<sup>d</sup>Excludes fuller's earth; included with values that cannot be disclosed.<sup>e</sup>Includes fluorspar, tripoli, lead, zinc, silver, copper, peat, for 1988 and 1989 and barite for 1989.TABLE 24 Illinois coal shipped to consumers in the United States, 1987-89<sup>a</sup>

Consumers	1987	1988	1989	1987-88 change (%)	1988-89 (change %)
	Jan-Sept	Jan-Sept (1000 tons)	Jan-Sept		
Electric utilities	39,946	39,112	40,508	- 2.1	+ 3.6
Coke and gas plant	1,382	1,040	1,215	- 24.7	+ 16.8
Retail dealers	207	212	339	+ 2.4	+ 59.9
Others	3,034	3,226	2,539	+ 6.3	- 21.3
Used at mine	2	1	25	- 50.0	+2400.0
Mine stock (adjusted)	1,371	1,734	1,802	+ 26.5	+ 3.9
Foreign	207	332	418	+ 60.4	+ 25.9
<b>Total</b>	<b>44,778</b>	<b>43,921</b>	<b>45,044</b>	<b>- 1.9</b>	<b>+ 2.6</b>

<sup>a</sup>Source: U.S. Department of Energy, Coal Distribution, January-September, 1987, 1988, and 1989.

TABLE 25 Coal shipments from Illinois to other states, 1987-89<sup>a</sup>

Consumers	1987 Jan-Sept	1988 Jan-Sept (1000 tons)	1989 Jan-Sept	1987-88 change (%)	1988-89 (change %)
Illinois	13,774	13,023	12,802	- 5.5	- 1.7
Missouri	10,432	9,988	10,737	- 4.3	+ 7.5
Indiana	8,248	6,963	7,299	- 15.6	+ 4.8
Wisconsin	1,348	1,866	1,409	+ 38.4	- 24.5
Georgia	4,307	4,298	3,891	- 0.2	- 9.5
Iowa	1,698	1,950	1,887	+ 14.8	- 3.2
Alabama	c	314	663	--	+111.2
Florida	2,654	3,048	2,859	+ 14.8	- 6.2
Tennessee	934	985	1,206	+ 5.5	+ 22.4
Mississippi	436	506	1,031	+ 16.1	+103.8
Other states <sup>b</sup>	740	648	842	- 12.4	+ 29.9
Exports	<u>207</u>	<u>332</u>	<u>418</u>	<u>+ 60.4</u>	<u>+ 25.9</u>
Total	44,778	43,921	45,044	- 1.9	+ 2.6

<sup>a</sup> Source: U.S. Department of Energy, Coal Distribution, January-September, 1987, 1988, and 1989.

<sup>b</sup> Arkansas, California, Kansas, Kentucky, Michigan, Minnesota, Ohio, Texas (1987, 1988, 1989), Louisiana (1987, 1989), Massachusetts (1987, 1988), Montana (1987), New York (1989), North Dakota (1989), Pennsylvania (1987, 1989), West Virginia (1989).

<sup>c</sup> Quantity is less than 500 short tons.





